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Uncovering the Link Between Effectuation and Design Thinking in Early Stage Startups

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<p>This thesis looks at the research question - <i>“what is the link between effectuation and design thinking in the entrepreneurial process?”</i>. It answers this question, first with a comprehensive look at existing literature and theory on the two concepts and follows that with empirical research to determine if the question can be answered in practice.</p> <p>The empirical research is done in the form of a multi case study, with nineteen early stage startup entrepreneurs, with all but one of them being based in Finland and running their startup in this context. The cross case analysis revealed that the research question can be successfully answered in the affirmative - there are clear links between effectuation and design thinking.</p> <p>The findings section covers the 5 main findings which include links between “means” with the “challenge”, “goals” with “discover” and “define”, and also how “affordable loss” and “leveraging surprises” influences the “develop” and “deliver” elements of design thinking. These findings, when compared to existing theory, reveal practical validation for some existing concepts while also providing new theoretical contributions for others. Based on these findings, a hybrid, effectual design process model is proposed, which aims to account for the criticisms and gaps in the individual theoretical constructs by blending their strengths to cover for their weaknesses.</p> <p>Overall, this research provides strong evidence of the link between the theoretical constructs and suggestions on its relevance to practical application, entrepreneurial education and more. It also provides avenues for future research that can build on this and provide an even more comprehensive process structure on the path to creating a unified entrepreneurial process.</p>	
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1 Introduction

This research explores the link between two concepts - effectuation (Sarasvathy, 2001) and design thinking (Brown, 2008). In literature, effectuation is defined as a mindset and a non-linear process (Sarasvathy, 2001) that effective entrepreneurs use to navigate uncertainty, overcome setbacks and deliver successful outcomes on their entrepreneurial journey. Design thinking is often defined as a practice defined by a human centered approach carried out in two phases of divergent and convergent thinking via four steps – discover, define, develop and deliver (Dorst, 2011). These four steps are often showcased as the “double diamond” design process model created by the Design Council UK (Tschimmel, 2012).

The definitions already hint at possible links between the two concepts. For example, building on the definition of design thinking, Brenner, Uebernickel, and Abrell (2016) go on to establish its multifaceted nature of being a human-centered mindset, process and toolbox, similar to the characterization of effectuation as a mindset and process (Sarasvathy, 2008). Nielsen and Christensen (2014) consider effectuation to be a facet of entrepreneurship that is particularly suited to designers and design management due to the way it juxtaposes the linear, causal thinking that characterizes traditional design process. In fact, effectuation has even been considered an example of design science work in the entrepreneurship field (Romme & Reymen, 2018).

Effectuation and design thinking do not exist in a vacuum and have key elements of overlap and differences that can prove complementary in their practical application in entrepreneurial contexts. This emerged from a wide comparative study of entrepreneurial processes where effectuation was identified as a possible unifying entrepreneurship process model but for a few shortcomings (Moroz & Hindle, 2012). These shortcomings include inconsistencies in establishing the interplay between effectual logic and causal logic, and for failing to consider the potential for entrepreneurial process to produce profound changes, like Schumpeter’s “creative destruction” (Diamond, 2006). These early indications from literature hint at the possibility of a link between the two concepts at a theoretical level but not an empirical one, thus the intent of

this research is to identify links between effectuation and design thinking by studying the entrepreneurial journey in early stage startups.

Uncovering the links and differences between effectuation and design thinking has the potential to expand on existing theorizations of the two models by studying how they work together and complement each other. By doing so, this research aims to address some of the criticisms of effectuation and proposes a combined theoretical model that comes closer to forming a unifying framework for entrepreneurial process. Overall, there is sufficient precedent that not just hints at an existing link but also establishes a need to go deeper into studying this topic. To achieve this, empirical research is conducted to understand these topics in practice via a multi case study of the entrepreneurial journey of early stage entrepreneurs in Finland.

1.1 Research Aim & Approach

The primary research aim was to explore the core question of “**what is the link between effectuation and design thinking in the entrepreneurial process?**”. The goal was to use the findings to craft a framework that better explains the interplay of effectuation and design thinking in entrepreneurial practice. This provided the possibility for a novel research outcome that builds on existing knowledge to create an entrepreneurial process that comes closer to being a unifying theory that is distinct and generic (Moroz & Hindle, 2012). This was sufficient justification to pursue this research aim by combining empirical research with a detailed literature study.

To delve more deeply into the research question, particularly into existing theoretical constructs, it was further subdivided into the following sections.

1. What are the key elements of an entrepreneurial process?
2. What is effectuation?
3. What is design thinking?

For the first question, literature around entrepreneurial process studies was explored to try and provide a lens through which the subsequent research could be done. The questions on

effectuation and design thinking reviewed existing literature of the two key topics and also touched on the evolution in their understanding over time. These were then analyzed to establish connections, purely from a secondary research perspective, and then juxtapose with empirical findings.

It is important to note here that most existing studies focus on the individual topics of effectuation and design thinking in isolation with just a few looking at both. Among the range of sources explored and considered to build the theoretical foundation, there was a very limited amount prior work that directly explored the possibility of there being links between the two. The empirical research aspect of this study attempts to take the first steps toward filling this gap by building on the literature around these key themes in a systematic manner and drawing conclusions based on observed links in theory and in practice. In addition to the possibility of a novel research outcome stated earlier, the potential to uncover a wide range of future research directions that could emerge from it provided sufficient rationale to pursue this topic in greater detail.

1.2 Thesis Structure

The structure of the thesis will follow that of a traditional research based report. Following this current introduction section is the literature review in which existing research, literature and theoretical constructs around entrepreneurial processes, effectuation and design thinking are presented. This review section considers the theoretical definition as well as evolving perspectives on the theory. This literature review is followed by an explanation of the research methodology including the research sample and timeline. This is followed by a showcase of the findings from empirical research. These findings are then discussed and juxtaposed with existing theory to understand the implications, theoretical contribution, limitations and future research possibilities. Following this, comes the final section which summarizes the key outcomes of the study and provides conclusions. The appendices include a sample research questionnaire that was used to gather the empirical data.

2 Literature Review

This literature review provides an overview of the existing theoretical base in the topics pertaining to this study. To explore the core question of “*what is the link between effectuation and design thinking in the entrepreneurial process?*”, existing academic literature was analyzed from the perspective of the three questions established in the research aim. The question on entrepreneurial process was intended to provide a lens and a foundation that enables further discussion of both effectuation and design thinking in the entrepreneurial environment. In addition, since the field research will be conducted as case studies with founders and C-level entrepreneurs from early stage startups, it is important to establish this foundation to provide a consistent framework that allows case study analysis to be theory driven (Yin, 2009).

In the following subsections, based on the research questions, a descriptive understanding of the individual topics is established, followed by a brief exploration of the evolution in each of the topics over time. This exploration proves relevant as it provides a grounding for the later discussion section in helping understand if a) there is a link between the concepts at a theoretical level and b) there are any implications that emerge from the empirical research that expand on this theoretical base. In essence, this serves as a foundation to analyze the theoretical contribution of the empirical research findings.

2.1 Elements of the entrepreneurial process

To understand scholarly works that have gone into describing the process nature of an entrepreneurial endeavor, references recommended by the Aalto course, Entrepreneurship and Society, proved to be a good starting point. These form the foundation for understanding some of the key elements of the entrepreneurial process.

Moroz and Hindle (2012) approached their study of process via an extensive review of existing literature to uncover unifying, characterizing elements of the entrepreneurial process that fulfill the requirements of being both generic and distinct. They focused on discovering insights about what entrepreneurs do and how they do it by analyzing literature about 32 different, existing

process models for entrepreneurship. Of the 32, only four models were considered to be “converging on conceptualizing the entrepreneurial process by what was simultaneously generic and distinct about the process” (Moroz & Hindle, 2012). The authors include effectuation, as espoused by Sarasvathy (2001) among these four models but with elements of criticism that are explored further in the section that delves into effectuation literature. At the end of their analysis, Moroz and Hindle (2012) were unable to find a single model that passed the test of being both generic and distinct, but noted that all the process models did have the following key points of convergence –

1. the relationship between the individual and the opportunity
2. the transformative and disruptive value of knowledge
3. the creation of value via new business models
4. the importance of temporality, context and commitment to action.

To this effect, Hjorth, Holt, and Steyaert (2015) seem to be in agreement as they draw from existing research on change from the perspective of a wide range of fields, including technology studies, organizational psychology, strategy studies and human resource management. Based on these range of sources, the authors establish that any future study of the entrepreneurial process needs to account for process thinking and specifically an inquiry into its five key qualities - temporality, wholeness, openness, force and potentiality. The authors go on to further indicate how these five aspects of process thinking do not work in isolation, but rather interplay with each other in the entrepreneurial process. They conclude by advocating for further empirical studies into entrepreneurship process thinking and the centering of “creation” in the overall frame of research, especially from the perspective of organization-creation. This is echoed by McMullen and Dimov (2013) who establish that entrepreneurship should be studied as a process that transpires over time. They further go on to equate entrepreneurship to a journey with a set of conditions that must be met, specifically focusing on how it must consider motive, means and opportunity - echoing point (1) above. Jack and Anderson (2002) establish a deeper interconnectedness even between the points of convergence by considering how context (point 4

above), from the perspective of embeddedness, influences the entrepreneurial opportunity that is pursued (point 1 above).

In the study by Reymen et al. (2015), they focus on decision-making as an important aspect of the entrepreneurial process to uncover what sort of logic entrepreneurs employ to do so. The authors perform their analysis through the lens of effectual and causal decision-making but since they use a process-based and longitudinal approach, these two decision-making logics are not viewed as competing but rather as complementary. The two logics were compared on several factors – the basis for taking action, the attitude toward outsiders, and the respective views on risk and resources. They conclude that entrepreneurs use hybrid decision-making logics and often shift from one dominant logic to the other. The rationale for this shift, according to the authors, depends on the context of the entrepreneurial situation, particularly that of the “venture scope” – whether narrow or broad. They also conclude that for situations with a wide venture scope, effectuation “allows responding flexibly to changing circumstances” (Reymen et al., 2015).

Therefore, by distilling the elements from all the aforementioned literature, it is possible to characterize the core elements of entrepreneurial process into the list shown in Table 1.

Table 1 – Core characteristics of an entrepreneurial process

Characteristic	Definition
Means	The resources available to act on any opportunity
Opportunity	The link between the individual entrepreneur and the selected opportunity
Action	Willingness to go beyond planning or resource allocation, toward execution.
Knowledge	The way new knowledge has both transformative and disruptive value
Value Creation	The creation of new economic activity, usually via new business models
Temporality	The influence of time on various elements of the entrepreneurial journey
Context	The entrepreneur’s context that influences both the opportunity & execution

Moroz and Hindle (2012) concluded their study across 32 processes by stating that there is a need for an evidence based model of entrepreneurial process that incorporates the convergent points they identified as well as some of the best features of extant process models. They go further to suggest that there is not a need for an artificially unified theoretical approach but rather a refocusing of the existing work towards a clearer understanding. With this as the foundation, this thesis focused on exploring whether design thinking could be used as a means of refocusing existing work on effectuation, an entrepreneurial process they have already identified, with certain caveats, as coming close to a generic and distinct characterization of the entrepreneurial process. More importantly, effectuation is the only process identified that has direct implications in practice and this adds further justification as to why its study in this research can help.

Mansoori and Lackéus (2017) did their own comparative study that compared entrepreneurial processes that are categorized as prescriptive methods for entrepreneurs to follow and interestingly classified both effectuation and design thinking among these processes. They analyzed these processes from the perspective of their underlying logic, the core model, and the tactics employed at an implementational level and looked at them from the perspective of nine conceptual dimensions ranging from “uncertainty management” to “value creation” (Mansoori & Lackéus, 2017). Like Moroz and Hindle (2012), they conclude that all the methods analyzed in their research are in need of further development. While they identify that effectuation has strengths, they acknowledge that it has practical weaknesses as well which can be addressed by drawing from other entrepreneurial methods (such as design thinking), thus further justifying the need for this study.

The empirical side of this thesis research is influenced by the findings from McMullen and Dimov (2013) who establish that entrepreneurship should be studied not as various acts, but rather as a journey that transpires over time, with all its twists and turns. This helps account for the deep interconnectedness between the core elements of an entrepreneurial process as indicated in Table 1.

2.1.1 Are process and mindset interlinked?

To understand the interlinked nature between entrepreneurial process and the corresponding mindset, there was a brief exploration of cognition research. Mitchell et al. (2004) discuss various cognitive explanations that cover how elements of cognition such as sensing, elaboration and recovery (of initial input) influence key entrepreneurial process elements like opportunity identification and hence, value creation. Going further into neuroscience we find Wuebker et al., (2014) discussing how, from the basis of cognitive neuroscience, the entrepreneur's view of the world, that guides their way of working, depends on their cognitive structures and the assumptions that anchor those structures. This links to the conclusions drawn by McMullen and Dimov (2013) which state, through a rather unusual analogy to murder suspects, that the entrepreneurial journey must consider, among other things, the motive – which is directly influenced by the underlying cognitive structures of the entrepreneur.

To understand the mindset element further, some research was also conducted around metacognitive ability. Haynie, Shepherd, and Patzelt (2012) discuss how cognitive adaptability is linked with the entrepreneurial mindset, particularly as a driver for identifying opportunities, evolving goals and dealing with change in the environment. They also posit that knowledge learned from problem solving in one context is related via metacognitive resources to another context, in line with the role played by prior entrepreneurial experience being associated with greater success (Rotefoss & Kolvereid, 2005). While Rotefoss and Kolvereid, (2005) looked at entrepreneurial process from the perspective of factors that can predict individuals' success or failure, Baker, Miner, and Eesley (2003) focused more on how the entrepreneurial process is guided by improvisation. In the end, the key findings that emerged were that the mindset and process are closely interlinked and there is not sufficient indication to forcibly separate the definitions within the scope of this research.

2.2 Effectuation

After an empirical study with 27 entrepreneurs, Sarasvathy (2001) establishes effectuation, using business examples and thought experiments, as the underlying logic of control that drives the

creation of organizations and markets. This study was conducted to find a common rationale that defines how expert entrepreneurs navigate uncertainty and ambiguity in the early stages of startups. This rationale explained how the underlying foundation for entrepreneurial action is the use of effectual logic in creating new opportunities and the research then went on to discuss a range of implications at the economy level, market level, firm level and at the level of decision makers within a firm. The research also uncovered the fact that effectual entrepreneurial processes start with establishing an understanding of an entrepreneur's given means and then focusing on selecting possible opportunities and outcomes based on those means. According to Sarasvathy (2008) these means are the foundational element for decision-making under effectuation. The author is also clear that effectuation is not posited as better than causation but rather that both are required in different circumstances. One example was how, in the early stages of entrepreneurial endeavors, in situations where decision-making involves a great deal of uncertainty and ambiguity, effectuation provides a way to navigate between prediction and control.

2.2.1 The five principles of effectuation.

Sarasvathy (2008) expands on the key findings from her research to provide five core principles of effectuation as follows These principles indicate the core ways in which the effectual entrepreneur acts.

Bird in Hand - Identifying “Means”

Sarasvathy (2008) establishes this principle as the ability to come to a variety of possible outcomes given a starting point of understanding – “who I am, what I know, who I know”, essentially the “knowledge corridors” these entrepreneurs are in. It is the foundation and starting point of decision-making as mentioned in the previous section.

Affordable Loss

Affordable loss principle acts as a way of mitigating risk and creating new ways of reaching the market while minimizing the expenditure of resources (Sarasvathy, 2001). In this principle, the

focus is not on maximizing potential returns but rather identifying affordable losses to allow them to experiment with multiple strategies. This translates to minimum expenditure of resources in experimentation but also creates more options in the future. Once effectual entrepreneurs have an idea of their affordable loss, they choose to quickly test their hypothesis for solutions. The overall decision process in “affordable loss” involves “failure management” where the entrepreneur chooses to create opportunities for failure that can contribute to more effective learning over time (Dew, Read, Sarasvathy, & Wiltbank, 2009).

Lemonade - “Leveraging Surprise”

The “Lemonade” principle is focused on leveraging contingencies that arise from failed outcomes or unexpected changes in circumstances (Sarasvathy, 2001). In this principle, the emphasis is on exploiting contingencies from situations that arise unexpectedly over time. The underlying principle is one of flexibility and adapting to the circumstances as they are encountered.

Patchwork Quilt - “Interactions and Commitments” for Strategic Partnerships

The fourth principle of effectuation focuses on how expert entrepreneurs, over the course of their creation process, encounter various stakeholders, some of whom are willing to pre-commit to the solution as an eventual partner (Sarasvathy, 2008). These partners often have some aspect of the “go to market” strategy covered, for example a buyer or distributor. In this principle, instead of competition, it states that effectual entrepreneurs focus on strategic alliances and pre-commitments with stakeholders to reduce uncertainty and build greater barriers to entry.

Pilot in the Plane - Identifying “New Products, Markets and Firms” via Control

Sarasvathy (2008) defines this principle as being related to control, and specifically the idea that by influencing the elements that are within the entrepreneur’s realm of control, the entrepreneur is controlling the future. This is the underlying effectual logic that drives the other four principles. In this principle, rather than focusing on predicting the future, the focus of an

effectual entrepreneur is on controlling the future by taking decisions on and selecting new products, markets and firms that are within their sphere of control.

2.2.2 Effectuation Process Model

Sarasvathy (2001) establishes a rudimentary effectuation process that starts from the individual entrepreneur's means. It is an action oriented process that quickly moves from their given means or an understanding of "who am I?" and "what do I know?" to identifying several possible goals or imagined ends by thinking about "what can I do?" and considering multiple potential outcomes. This is highlighted in Figure 1 below via the Society for Effectual Action (2018).

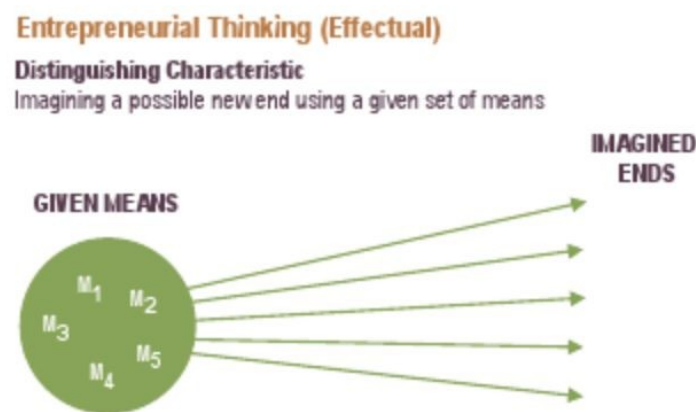


Figure 1 - Given means to imagined ends (Society for Effectual Action, 2018)

The choice of goals being pursued can be influenced by the entrepreneur's measure of affordable loss as a way of mitigating risk. Following the determination of goals, the entrepreneur begins to interact with others to obtain commitments toward co-creating a new venture. The partners who emerge from these commitments can help further add new means and clarify goals. The whole process can also be influenced by the element of surprise, which can affect the means and the goals as well.

It is important to note that this process is cyclical and it might take multiple loops of redefining means and goals while leveraging new surprises to come to an effective output of a new product,

market, or firm. Figure 2 below that provides an effective overview of this overall process (Sarasvathy & University of Virginia, 2011).

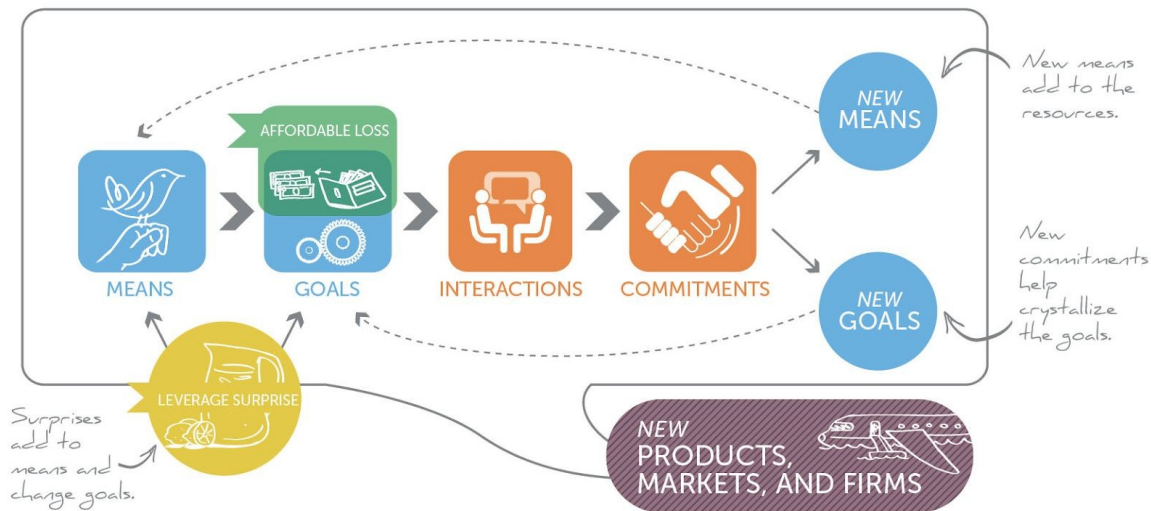


Figure 2 - Overview of an effectual process

For the remainder of the research, to allow for consistency, the terminology on effectuation will be linked to the usage in image 1 and the five core principles of effectuation.

2.2.3 Evolving perspectives on effectuation.

In recent research into decision-making based on effectuation, Long, Xia, and Hu (2017) establish the nuanced way in which the nature of opportunity discovery further defines the principles of effectuation that take precedence. Specifically, the authors found that “fortuitous” discovery of opportunities emerge from alertness to those opportunities and entrepreneurs building from these opportunities rely on the Bird in Hand principle and the Lemonade principle. In addition, the authors also found that in fortuitous opportunity situations, the Patchwork Quilt principle and the Affordable loss principle are less likely to be the predominant drivers of decision-making.

Arend, Sarooghi, and Burkemper (2015) start off by looking at effectuation from a long term perspective, assessing the perceptions of scholars after the theory had existed for over a decade and gauging their position on whether they would consider it a viable theory or not. Over the

course of their research, they determined that effectuation was underdeveloped and limited in scope but has the potential to become a solid theoretical model, with several suggestions proposed as to how that potential can be achieved. It is however, impossible to consider this research in isolation as Read, Sarasvathy, Dew, and Wiltbank (2016) provide a response to Arend et al. (2015) that addresses several of their criticisms. Taking both these perspectives into account and keeping in mind the scope of this research, the most interesting of these suggestions from the first paper revolve around showcasing not just how effectuation differs but also what effectuation does better than alternative approaches and to provide a focused approach on how it can be applied. In this respect, both the papers actually tend to agree and Read et al. (2016) go on to suggest the need for further empirical research to establish better theory, particularly around deliberate practice and the link with predictive strategies.

In some ways, the research done by Mansoori and Lackéus (2017) echoes the existence of gaps in effectuation, particularly from the perspective of not having behavioral tactics that can be applied in hands on manner and lacking an explicit avenue to gain more knowledge outside of partnerships. However, the research also addresses some of the areas where effectuation stands out in comparison to other approaches, particularly from the perspective of uncertainty management, resource management, and the ability to redirect and reorient in the face of surprises.

Sarasvathy (2008) states how, in real life, entrepreneurs balance causal and effectual approaches depending on circumstances, the company's position in the life cycle and their level of expertise. In particular, her research indicates that effectual logic is more prominent in the early stages of the life cycle while more causal, decision focused approaches gain prominence as the startup develops. This seems to suggest that the two concepts co-exist but as inverses that are not directly linked to each other. This in line with the criticism of effectuation made by Kraaijenbrink (2012) that the extreme distinction between the effectual and causal logic is an oversimplification.

Murdock and Varnes (2018) expand on existing research on effectuation by analyzing it through the lens of "actor-network theory" (ANT). The authors use ANT to establish how in an effectual

process, the building of partnerships and leveraging of networks causes the entrepreneurial endeavor to be fluidly evolving its goals and context to adapt to the needs of new entities in the network. They show how each new entity in the network changes the definition of “bird in hand” in that instant and the entrepreneurial endeavor adapts itself to align with the goals of this new entity, thus leveraging “lemonade” and “affordable loss”.

Moroz and Hindle (2012) while acknowledging effectuation’s potential to be a defining entrepreneurial process model, echo some of these criticisms and also add how effectuation

- Is unsuccessful in conveying how effectual and causal logic co-exist within the entrepreneur and are used interchangeably in various contexts
- Ignores the causal exchange between the entrepreneur and the context they exist in and the way it can lead to imagining new outcomes
- Minimizes the requirement for purposeful human action, particularly from the perspective of goal driven motivation, in entrepreneurial processes.
- is not well suited to explore entrepreneurial process as a mechanism for creating profound change like what is described by Schumpeter’s “creative destruction” (Diamond, 2006)

Moroz and Hindle (2012) conclude that in order to consider effectuation to be a generic and distinctive characterization of entrepreneurial process, these criticisms above need to be addressed. Thus, the remainder of the literature research is focused on the exploration of design thinking, in an attempt to uncover the links between that and effectual logic as a means of addressing their criticism.

2.3 Design Thinking

Design thinking as a term, can trace its origin to the book of the same name by Rowe (1987). However, the theoretical basis and conceptualization for design however goes back even further, to the 1960s and the work of Herbert Simon, one of the most cited resources on design (Micheli, Wilner, Bhatti, Mura, & Beverland, 2019). He was the first to define design as a science in “The

Sciences of the Artificial”, (Simon, 1996). Fast forward to the current era, and there are two sources that can be considered to have popularized “design thinking” in recent times.

The first would be the work of IDEO, whose former CEO, Tim Brown, defined “design thinking” in Harvard Business Review as “a discipline that uses the designer’s sensibility and methods to match people’s needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity” (Brown, 2008). In the article, he provides three key phases that projects must pass through, often repeatedly in an iterative manner – “inspiration”, “ideation” and “implementation”. The overall process is described in Figure 3 below (Nessler, 2016).

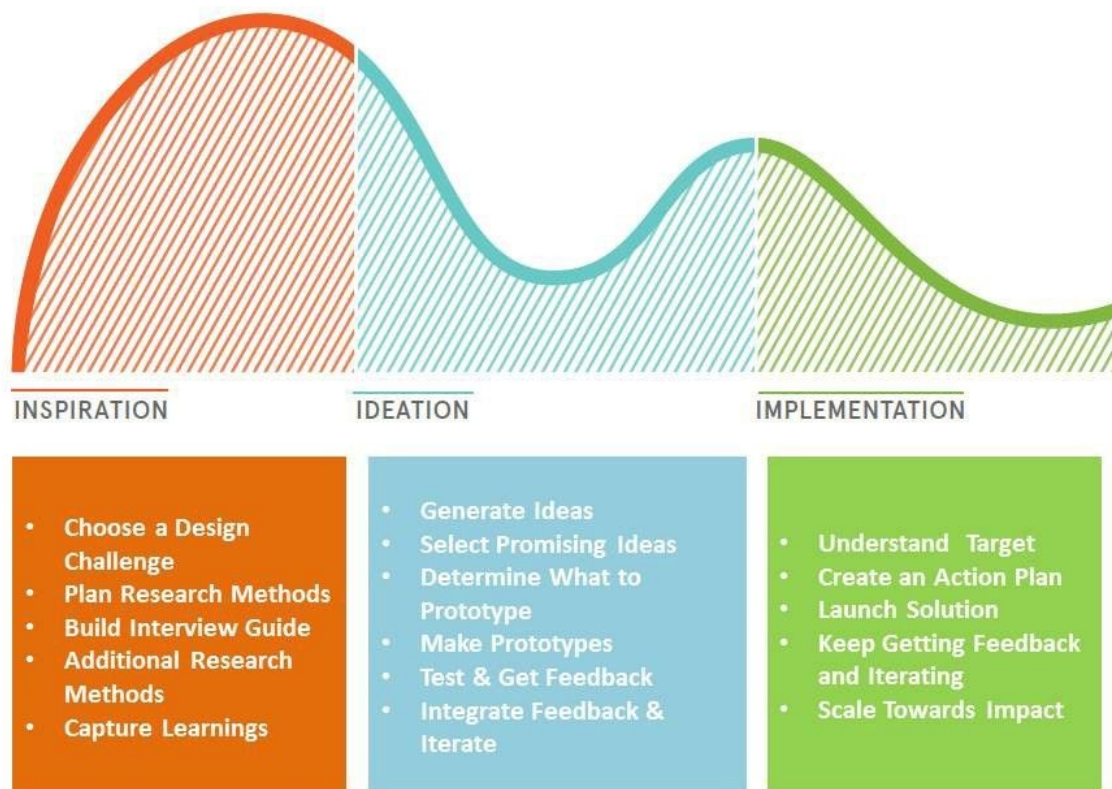


Figure 3 - Overview of IDEO's three I's process for Design Thinking (Nessler, 2016)

The inspiration phase is where the opportunity is identified (the design challenge) and the ideation phase allows for assessing the context in a human-centered way to develop a focus for

the final outcome (Brown, 2008). The author also advises that for the most successful outcomes, design thinkers must be involved at the very start of an innovation process, before any direction has been set. Brown (2008) further states that the creation of ideas that better meet consumer needs and desires leads to dramatic new forms of value, emphasizing the importance of a user centered, iterative process to deliver this (Micheli et al., 2019). In addition, to deliver this, a design thinker's personality must possess these five key characteristics (Brown, 2008)

1. Empathy – viewing the world from multiple perspectives and taking a people-centric approach.
2. Integrative thinking – going beyond analytical processes to see all the aspects of a complex problem and creating novel solutions. This involves taking a systemic view of things.
3. Optimism – assuming that no matter how challenging, even one potential solution is better than existing alternatives
4. Experimentation – going beyond incremental tweaks to question and experiment in creative ways that can generate entirely new directions. The idea is to try early and often via rapid experimentation and proto-typing.
5. Collaboration – Embracing the reality of the enthusiastic interdisciplinary collaborator and being open to seeking outside help. This is best done by expanding the ecosystem and looking for opportunities to co-create with stakeholders.

The second source that popularized “design thinking” would be the UK Design Council and their “Double Diamond” process representation of it (Design Council UK, 2019). While comparing different design processes, Tschimmel (2012) discusses the diagram in more detail, focusing on how this process describes the divergent and convergent stages of the design process across the four Ds – discover, define, develop and deliver. The article also discusses other design models including IDEO's HCD model and three I's model and the service design thinking (SDT) model. The author also establishes how, in any innovation process, design thinking relies on the designer's capacity to simultaneously consider human needs, available material and technical

resources, and the constraints and opportunities of the project. Tschimmel (2012) then goes on to review design thinking tools such as research, information mapping, personas and more but these will not be covered here as they are beyond the scope of the current research. The Design Council's 2007 version of the double diamond diagram can be found in Figure 4 below (Choo, Vere, & Choi, 2017)

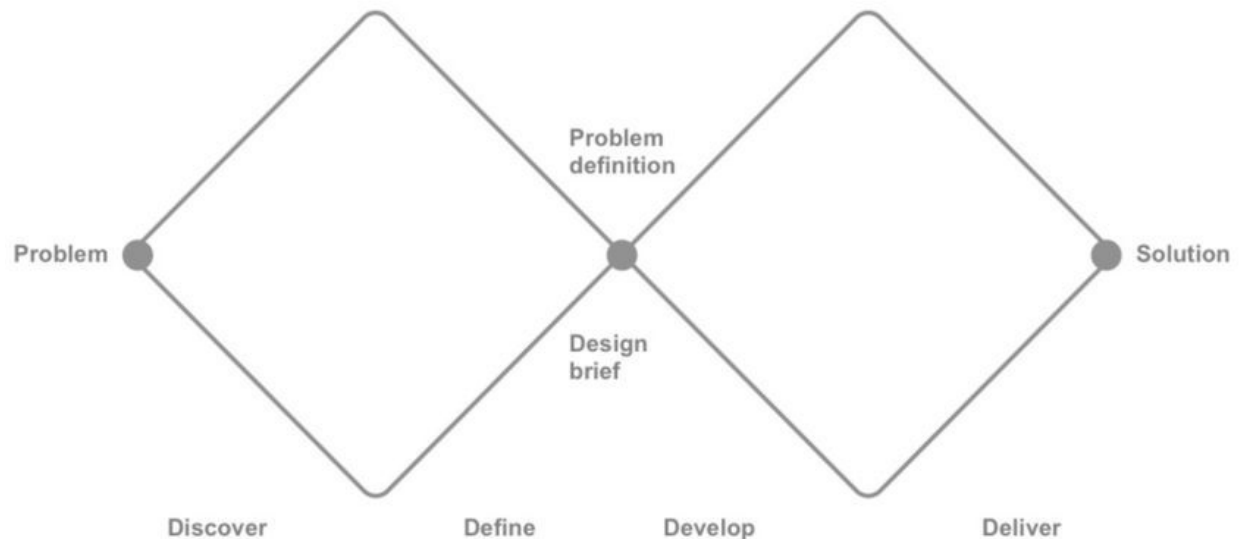


Figure 4 - Double Diamond Diagram (Design Council UK, 2007)

it is important to note that the double diamond or the three I's are simply two different representations of a process that is fundamentally operating in a similar vein. Design processes often start with one of these as the base and can be adapted based on the needs of the project.

2.3.1 Steps in the Double Diamond Design Thinking Process

For the sake of this research, the design thinking process that will form the basis of the remainder of the process will be the Double Diamond with its four core phases - discover, define, develop, deliver (Tschimmel, 2012). The starting point for this process is with a broadly defined problem as indicated in Figure 4.

Discover - Exploring the Problem Space

In this phase, once a problem has been identified, the designer explores the domain seeking new opportunities, markets, information, trends and insights (Tschimmel, 2012). The primary goal is to help people avoid assumptions and truly understand what the problem is, often by speaking to those directly impacted by the problem, thus in turn, the solution (UK Design Council, 2015).

Define - Narrowing Down a Problem Statement

In this phase, the insights gathered from the exploration of the problem phase are reviewed, selected and discarded until a clear problem definition is established, often involving buy in and approvals from key stakeholders to get to this point (Tschimmel, 2012). The primary goal is to define the original problem (the starting point) in a way that reflects the realities of the context that the problem and those most affected by it (and the solution) exist in.

At the end of this phase, the original problem has been tweaked and redefined as a problem statement, and subsequent work is based on that statement as it can be safely assumed that the need for a solution in this space has been sufficiently explored and validated in the “discover” and “define” phases.

Develop - Ideating Possible Solutions

Once a clear problem statement is defined, divergent thinking comes into play again as the focus is on ideating and developing a wide range of solutions, using methods like brainstorming and scenarios (Tschimmel, 2012). This phase involves creating many solutions to a clearly defined problem and often involves co-designing with a range of people (UK Design Council, 2015).

Deliver - Prototyping, Iterating and Finalizing a Solution

This phase takes the wide range of solutions that were developed and begins to prototype, test and iterate until a solution can be produced and launched (Tschimmel, 2012). The tests are often

done on a smaller scale, with possible solutions that do not work getting rejected and the ones that have potential to work getting improved in a cyclical manner (UK Design Council, 2015).

Overall

The double diamond is depicted as a simple linear process, but that is not the case in practice. It can be a much more complex and intensive process that is cyclical in nature, to the point where it is possible for a developed solution to still fail and the process to start over (UK Design Council, 2015). It is also not a rigid process as it can be adapted depending on the specific context and requires the elements of a design thinker's personality as defined by Brown (2008).

Other Process Models?

It is important to note that the selection of this model does not exclude the concepts addressed in the other process models. It could be argued that the core difference between the three I's model and the double diamond is the more direct visual representation of the divergent and convergent phases (Tschimmel, 2012). The similarities in the divergent and convergent nature of the three I's process (Brown, 2008) and the double diamond are evident in Figure 5 below (Nessler, 2016).

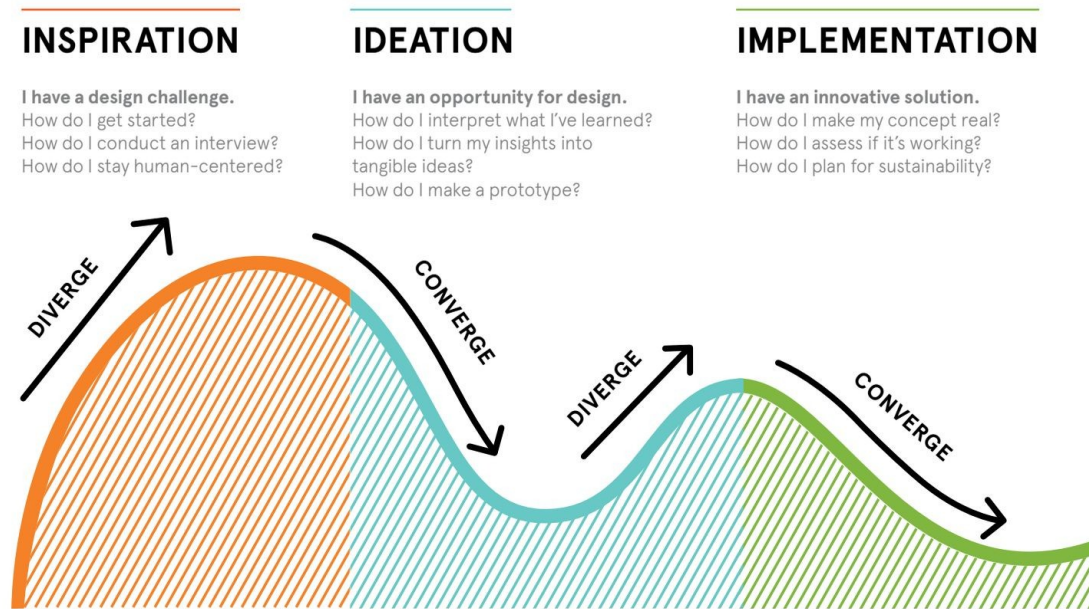


Figure 5 - Three I's model (Brown, 2008) and its divergent and convergent nature (Nessler, 2016)

As Micheli et al. (2019) establish in their research, the most frequently cited process models have a certain degree of commonality. They all start with an exploration of the problem space to understand the problem, followed by an ideation stage which then leads to implementation and testing, which are based on prototyping and iteration (Micheli et al., 2019).

2.3.2 Attributes of Design Thinking as both Mindset and Process

While the previous section looked at Design thinking as a process, the literature does provide sufficient evidence to indicate it is hybrid nature, making it more directly comparable to effectuation. Schweitzer, Groeger, and Sobel (2016) did an in depth literature analysis to uncover the key components that define a design thinking mindset and validated these via in-depth interviews with innovation managers who are active design practitioners. Based on their research, they uncovered 11 design thinking mindsets. Some of the key mindsets, excluding the ones that overlap with the previously discussed research by Brown (2008) have been indicated below.

1. Inquisitive and open to new perspectives and learning – design practitioners learn by exploring, experimenting, testing and gathering feedback.
2. Mindful of Process and thinking modes – being constantly aware of the current context of the work and employing convergent or divergent thinking patterns accordingly
3. Taking action deliberately and overtly –leaning towards action oriented behavior over discussion and conceptual behavior. These actions are often guided by what was learned via prior experience and experimentation.
4. Accepting of uncertainty and open to risk – practitioners often enter the process without knowing the final outcomes or the number of iterations required and thus to proceed successfully without being paralyzed by fear or feeling anxiety about failure, there is a need to embrace uncertainty and ambiguity
5. Modelling behavior and optimism – design practitioners build momentum on projects and bring together disparate groups of people in doing so.
6. Desire and determination to make a difference
7. Critical questioning – to ensure that ideas are not suppressed without validation and consensus is not formed around outcomes without significant impact

Looking beyond the pure mindset or pure process perspective, Brenner et al. (2016), look at the hybrid nature of design thinking. The authors stipulate that, not only is design thinking a process and mindset as previously indicated, it is also a toolbox. Their definitions for mindset are similar to what has previously been discussed but at the process level, they look at the design process at two levels – the micro process and the macro process – where each step of the macro process sees multiple iterations of the micro process. Brenner et al. also go on to define the toolbox approach that supports the design thinking process and mindset with tools such as stakeholder mapping, Five Whys and storytelling.

More recently, Micheli, Wilner, Bhatti, Mura, and Beverland (2019) conducted a systematic review of design thinking literature to identify 10 principal attributes and eight tools & methods. These were validated with professional designers via a card sorting exercise, and a subsequent cluster analysis of the existing literature. They identified the following key attributes

- Creativity and innovation – attributes of design thinking, such as prototyping and abductive logic are key means of generating novel ideas and innovating
- User-Centeredness and involvement – driven with a foundation in empathy
- Problem Solving – particularly when it comes to wicked problems as defined by Buchanan (1992)
- Iteration and experimentation – via the use of prototypes
- Interdisciplinary collaboration – as a means of addressing the complexity of a problem
- Ability to Visualize – design thinking is closely related to design practice
- Gestalt view – the ability to understand problems in a systemic way
- Abductive reasoning – the creation of new knowledge or insight by focusing on assertion-based workable solutions
- Tolerance of ambiguity and failure
- Blending analysis and intuition.

2.3.3 Evolving perspectives on design thinking

As has been mentioned previously, Herbert Simon defining design as a science in the 60s (Micheli et al., 2019), and Buchanan (1992) focusing on design thinking's ability to conceive new ideas and address "wicked" problems provided among the early perspectives on design thinking. The exploration of "wicked" problems stemmed from research by Rittel and Webber (1973) which established that many design problems were not clearly defined and the process to find solutions required navigating uncertainty and ambiguity. Hassi and Laakso (2011) track this evolution in great detail, starting from the pure design science expression of Simon, to the increasing popularity from a management context in the early 2000s, to present day, where IDEO is considered the major source that popularized design thinking as discussed in section 2.3.

Dorst (2011) aimed to come up with a more rigid definition. The author's intent was that this definition cuts through the vague generalizations present in popular discourse to something far more specific, centered around abductive thinking. In the article, the author uses a comparison between inductive, deductive and abductive thinking to first establish the thought process that goes into taking on open ended, complex problems – where the only known is the intended,

aspirational value of the end solution. The author establishes how experienced design practitioners focus on the development of a “frame” which involves the creation of a novel context through which a complex problem is tackled. Dorst goes on to state how expert design practitioners take on a problem by focusing on the broader problem context and trying to find clues that help them evolve the “frame” and how the creation of this frame is directly influenced by prior experiences. In the end, the author concludes that the creation of frames is this central approach to problem solving via design thinking.

Grots and Creuznacher (2016) look at the step by step elements of the process and add an initial step that is not explicitly indicated in the aforementioned four Ds model – the “understand” phase. This phase is focused on capturing the status quo, the current context from an ecosystem, organization, and situational perspective that is an important consideration before starting off on the process.

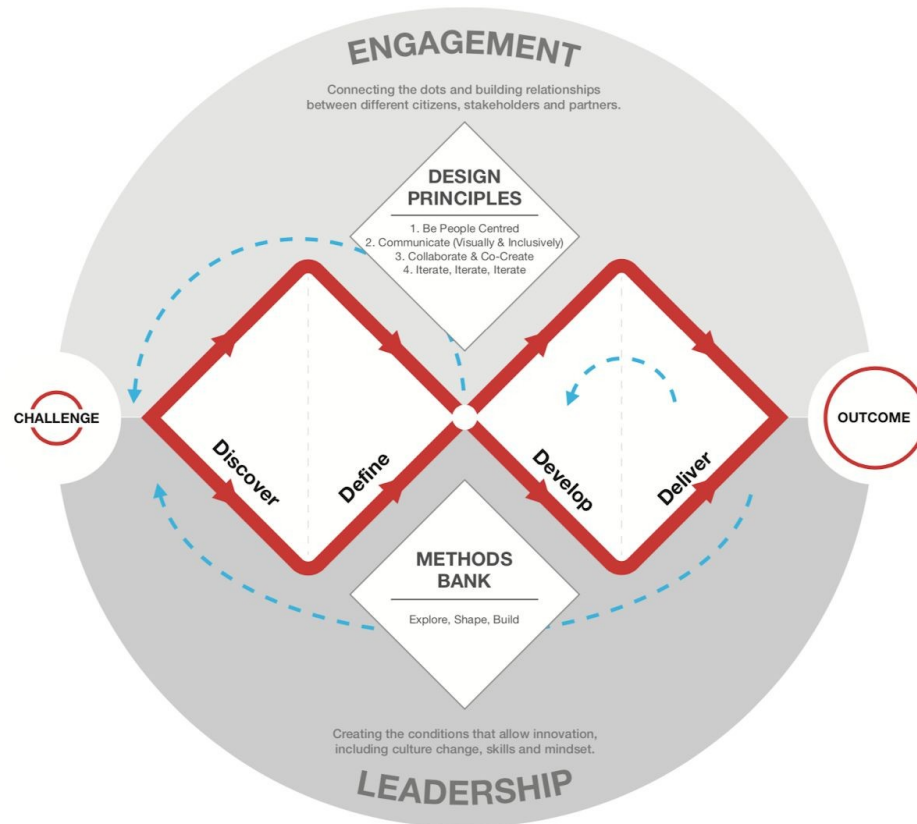
More recently, Lindgaard and Wesselius (2017) have looked at design thinking from the perspective of cognition and feeling. The authors, by going through key developments in cognitive science and embodied cognition, attempt to showcase how design practices are linked to a broader narrative around “the role of metaphor in generating experience and understanding”. They do a deep dive into the cognition of the designer and their thoughts and reasoning during design activity and emerge with links to feeling and metaphors. They also discuss the evolution of how “design thinking” has been understood, starting from a cognitive science approach and evolving into more of a rigid process before again, a recent re-emergence in analyzing it from a cognitive perspective.

In the comparative research done by Mansoori and Lackéus (2019), they touch on how design thinking from an entrepreneurial perspective has a few advantages as well as weaknesses. They emphasize the value of the orientation toward continuous learning, and ability to iterate and adapt to new knowledge and inputs that design thinking espouses. On the flip side, they are critical of its inability to account for uncertainty in the entrepreneurial process as it is not an aspect influencing any of the directions it prescribes. Mansoori and Lackéus (2017) also point out that design thinking is flawed in how it does not take into account resource management at

all, even though resources are an integral part of an entrepreneurial process due to its scarcity in typical startup situations. The authors also point out that, while design thinking becomes more applicable as a startup matures, and is capable of adapting to changes and iterating, the structured nature of the process means it has higher complexity. The complexity could mean that it is likely at a higher cost in a situation where the affordable loss is lower (Mansoori & Lackéus, 2019), and this could be restrictive for an entrepreneurial venture.

Potocnjak-Oxman, Kriz, and Nailer (2019) also explore design thinking from an entrepreneurial perspective, focusing on the role it can play in opportunity formation. They draw parallels between “wicked problems” (Buchanan, 1992) and the ambiguity and uncertainty in developing an entrepreneurial opportunity and use this as a basis to determine gaps in design thinking when it comes to entrepreneurial activity. The collaborative and action oriented approach of design thinking, which rely on reflective reframing as ideas evolve - these were found to encourage opportunity formation and entrepreneurial activity (Potocnjak-Oxman et al., 2019). On the flip side the authors found a similar negative outcome to Mansoori and Lackéus (2017) in how design thinking did not consider leveraging of resources and also lacked explicit definitions of value creation, and lacked methods to assess opportunities. Their findings seem to suggest gaps in design thinking when it comes to entrepreneurial activity, both in theory and practice.

These gaps would require evolution, and it seems, in acknowledgement of design thinking’s need to evolve, one of the process structures is evolving as well. 2019 marks the 15th year of the Double Diamond diagram and to commemorate this, the UK design council has put forward an updated version of the diagram as shown in Figure 6 below (Design Council UK, 2019).



© Design Council 2019

Figure 6 - Updated Double Diamond Diagram (Design Council UK, 2019)

The changes in the diagram partly reflect the importance of understanding and defining the context before setting off on the challenge, in line with the previously mentioned suggestions from Grots and Creuznacher (2016). The focus on iteration and looping back seems to indicate an acknowledgement of what is needed to navigate the “messy circumstances of wicked problems” (Rittel & Webber, 1973).

On an interesting note, at the Joint Futures conference in September, Priya Prakash (2019) provided several criticisms of design thinking in her keynote address, both from the current context and for the future. Her first criticism was around design thinking’s inability to account for unintended consequences, in part due to its detachment from the designer’s own values or questioning why a certain brief is pursued. Additional criticism was summed up by a provocative declaration of “this double diamond sucks” (Priya Prakash, 2019). Expanding on this, she

focused on several concerns or gaps whether it is how the process does not account for limited budgets/resources, a criticism shared by Mansoori and Lackéus (2017) and (Potocnjak-Oxman et al., 2019). Her other criticisms include how the design thinking double diamond does not consider risk effectively, nor does it consider ethics at a broader context despite design decisions creating outcomes that shape the world. This takes on even greater significance in the context of “wicked problems” (Rittel & Webber, 1973) which involve greater ambiguity, greater potential to shape the world and thus, in turn possessing significant risk as well.

2.4 Summary

Overall the literature review explored existing knowledge in effectuation, design thinking and entrepreneurial processes and synthesized an understanding that would form the theoretical base. The study has shown how both effectuation and design thinking have a hybrid nature, in that they can be considered a mindset as well as a process. The study of prior research, particularly when exploring evolving perspectives beyond the basic definitions of these two core topics provided several interesting insights. These include how the theories have been observed over time and what gaps, if any, other researchers have discovered. For example, the unsuitability of using design thinking in isolation for entrepreneurial processes, or the lack of hands on tools from effectuation, both act as examples of gaps in theory that act as great starting points to be explored further through empirical research and the discussion of its findings.

3 Methodology

To get a more holistic picture, this exploratory empirical research was conducted via a multi-case study (Bass, Beecham, & Noll, 2018) by talking to entrepreneurs across various startups as the goal was to develop new theoretical contributions. The case study approach is particularly effective in this context as it investigates a contemporary phenomenon within its real life context (Yin, 2009). The information gathered through these individual cases was then compared via a cross-case analysis (Miles & Huberman, 1994) to determine any trends or patterns that emerge from the research and the underlying reasons for these. The advantage of using this multi-case study structure was how it allowed for the analysis of empirical data while anchoring the narratives with the secondary data sources covered in the literature review.

To support and build on the studied literature, the empirical research focused on qualitative methodology to understand the perspectives of early stage startup entrepreneurs. Perry, Chandler, & Markova (2012) provide several suggestions for structuring this sort of research ranging from the appropriate research questions to the methods used as well as the types of data to collect. In the end, the qualitative approach was preferred to any quantitative methods as uncovering the mindset and the process of working in an entrepreneurial endeavor was not something that could be uncovered via a quantitative study or experiment. The research was conducted via one-on-one, in-person or remote interviews with the following characteristics that leverage various elements of qualitative research methods.

3.1 Research Setting

With each startup being considered as a separate case, the focus was on key individuals at who are responsible for decision-making and guiding the journey. This included founders and C-level startup executives such as the CEO or CTO as these were the ideal participants who could provide a clear picture of the entrepreneurial journey thus far and the key decisions. In addition, the focus was on early stage startups, as this is likely the period of greatest uncertainty in a startups lifespan, and thus, there would be a preference for “effectual reasoning over causal reasoning in the early stages of a new venture” (Sarasvathy, 2008). In addition, there was an

attempt to select startups who had received some form of initial funding, whether as a seed round or from an angel investor or venture fund. This was because of an assumption that the introduction of this funding could provide a need to reorient the startup to better align with the source of the funding, thus exhibiting an effectual approach as well.

3.2 Data Collection

The research used theoretical sampling to select cases (Eisenhardt, 1989). To ensure repeatability of findings and greater validity of generalized theoretical outcomes, it was important to ensure that variable external factors that can influence the operating conditions of the startup journey needed to be minimized. To achieve this and ensure the external factors are consistent, the research focused on early stage on Finnish startups while being domain agnostic. This ensured that the results would be generalizable and the findings repeatable within his context. In addition, to help further contextualize the results within this group while maintaining anonymity of the respondents, prior to each session, some data about the entrepreneurs and their respective startups was collected:

- Age of Startup (in years)
- Startup Domain
- Prior Entrepreneurial Endeavors - First timer vs Experienced
- Role in Startup

The primary method for data collection was via semi structured interviews. Each session was setup to be a guided conversation, 45-60 minutes in length (DiCicco-Bloom & Crabtree, 2006). In order to elicit more details about the entrepreneurial journey, it was important to capture the experiences of the entrepreneurs from which it would be possible to infer about effectual thinking. This part relied on elements of narrative research (Eriksson & Kovalainen, 2008), structured via various scenarios to get an account of specific events or actions and the entrepreneur's feelings during that experience.

The goal with any qualitative research is to achieve saturation as “failure to reach data saturation has an impact on the quality of the research conducted and hampers content validity” (Fusch & Ness, 2015). To achieve this, the research initially aimed for 10 case studies, with one or two

participants in each startup - thus a target sample size of 20 participants. However, due to the small size of the early stage startups, combined with intense demands on workload, this sample was tweaked. The sampling was adapted to focus on one key individual per startup, either a founder or a C-level executive who had been involved for the whole startup journey. Since the participant in each case was involved with the startup from the time of conception of the idea, triangulation of information pertaining to this journey was done to the extent possible from looking at publicly available content such as company blogs, Crunchbase listings and news.

At the conclusion of the research, a total of 19 case studies were conducted with 18 entrepreneurs based in Finland and one based in South Asia. An overview of the participants, with the contextual information can be found in Table 2 below

Table 2: Summary of Research Participants

Identifier	Experience	Domain	Startup Age	Role
A	First Time	Marketing	3 years	Co-Founder
B	First Time	Geoscience	5 years	Founder, CEO
C	Serial Entrepreneur	Social Media	3 years	Founder, CEO
D	First Time	Gaming	4 years	Co-Founder, CTO
E	First Time	Creative Tech	3 years	Founder, CEO
F	First Time	Tech	2 years	Founder, CEO
G	Serial Entrepreneur	Consulting	1 year	Co-Founder
H	First Time	Ed Tech	2 years	Founder, CEO
I	Serial Entrepreneur	Ed Tech	1 year	Founder, CEO
J	First Time	Emerging Tech	4 years	Co-Founder
K	First Time	Ed Tech	4 years	Co-Founder
L	Serial Entrepreneur	Ed Tech	5 years	Co-Founder
M	Serial Entrepreneur	Tech Hardware	3 years	Co-Founder, CMO
N	Serial Entrepreneur	Emerging Tech	2 years	Co-Founder
O	Serial Entrepreneur	Emerging Tech	2 years	Co-Founder
P	Serial Entrepreneur	Hospitality	2 years	Co-Founder, CEO
Q	First Time	Health and Fitness	2 years	Founder, CEO
R	First Time, Student	Architecture	1 year	Co-Founder

S	First Time, Student	Healthcare	1 year	Co-Founder
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As the table indicates, the average startup age was approximately two to three years. In addition, most had either received some level of external funding or had a source of income that allowed for some level of stability. One of the startups had managed to accelerate their process and were already in a more stable, growth stage, despite the startup age being close to the average. In contrast to this, one startup was filing for bankruptcy during the course of the overall research and at the time of publishing the findings, would have been fully shut down. As the table indicates, there were several serial entrepreneurs, and an interesting case was how one such serial entrepreneur decided to leverage their experience in running multiple startups to in turn provide consulting services to help build other startups.

All interviews were audio recorded with the consent of the participant who was provided with a full disclaimer that there would be no identifiable information shared publicly. As the moderator, notes were taken to capture key elements that might require deeper inquiry and later, the audio recordings were transcribed. In addition, each interview was followed by a 30 minute review from the moderator's side to clarify notes and mark initial observations that stood out.

The research process featured a series of scenario driven questions that asked the participant to imagine situations in the entrepreneurial journey and describe their thought process and actions related to it. The questions were inspired by the various elements of effectuation to enable a better structure to contrast with the literature research.

The scenarios were set up to indirectly probe the five core elements of effectuation. This was done in order to provide a consistent lens for observation of the behavior that was in line with theory while also providing respondents with open ended opportunities to contradict expected narratives that would be present if adhering specifically to either effectuation or design thinking. This was accomplished by setting up the scenarios within their entrepreneurial journey and inquiring about the following situations.

1. The starting point for the venture and considerations made before starting
2. decision-making for future directions

3. The formation of partnerships
4. Dealing with setbacks
5. Leveraging backup plans or other means of managing risk

In addition, a further question inquired about their process for developing their startup or specific solutions within the frame of their startup offering, to determine if design thinking or any other process was applicable. This concluded the first section of the research which sought to indirectly extract insights about effectuation and design thinking in practice.

Once these scenarios were explored indirectly, participants were asked about their awareness of the concepts of effectuation and design thinking, as a way to gauge if their ways of working in an entrepreneurial endeavor is influenced by prior knowledge of these processes. The session concluded with a few brief questions that inquire about the influence of funding, the definition of success and the entrepreneurs' vision for scaling and the associated way of working. Appendix A has the complete questionnaire available in the same format as was used to conduct the research.

Overall, this structure helped understand their perspective of the entrepreneurial journey so far for their firm. Following this, questions that are more direct were asked to determine the participant's knowledge of effectuation and design thinking. They were then given the opportunity to reflect on whether or not they are currently aware of and/or applying either to their entrepreneurial endeavor.

3.3 Data Analysis

The data collected was analyzed in an inductive approach by summarizing the key information, establishing links and deriving a theoretical framework (Thomas, 2006). This translated to a coding pattern which is adapted from an older edition of Creswell (2014)'s book on research and is indicated in more detail in Figure 7 on the next page as previously shared with the researcher as part of a lecture on research methods. This also allows for comparison with the literature review. The analysis process leveraged Atlas.TI to ensure a more systematic and well

documented process and as shown by Elo and Kyngäs (2008), the data was analyzed in three steps – preparation, organizing and reporting.

Table 1: The coding process in inductive analysis

Initial read through text data	Identify specific segments of information	Label the segments of information to create categories	Reduce overlap and redundancy among the categories	Create a model incorporating most important categories
Many pages of text	Many segments of text	30-40 categories	15-20 categories	3-8 categories

Note: Adapted from Creswell, 2002, Figure 9.4, p. 266

Figure 7 - The coding process in inductive analysis

Each interview was to be analyzed as an individual case before the cross-case analysis within each phenomenon. The coding within each case was carried out according to the process indicated in Figure 8 below.

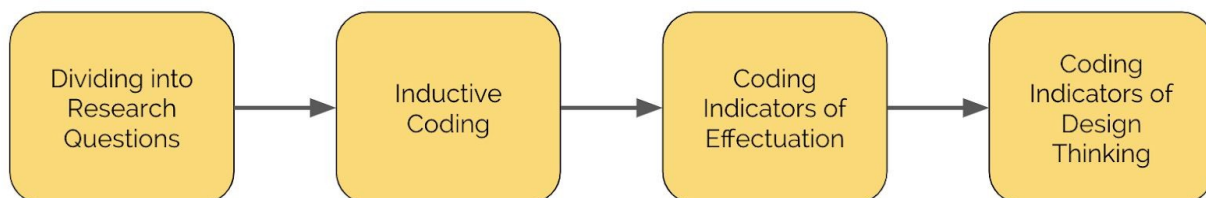


Figure 8 - Coding Process within individual cases

As shown in the figure, the individual transcripts were first divided into sections pertaining to the research questions indicated in Appendix A. Once this was complete, the first pass of coding was inductive in nature, seeking to capture observable phenomena such as decision-making, applied processes and idea origins. This was followed by explicitly looking for indicators of the existing theoretical conducts - effectuation and design thinking.

After the preparation phase was complete, the organization phase built on that by looking at any initial patterns that emerged within each case and also to see if there were any initial indications of the links between design thinking and effectuation that the research question sought to find. This was repeated for each case, and at the end of the process, over 250 individual codes emerged from across the 19 transcripts.

The Atlas.TI Network tool proved invaluable for the next phase as it allowed for a virtual visualization and grouping. The process followed was an adaptation of the affinity diagram method that is used by designers with sticky notes and whiteboards to effectively visualize groups and organize ideas (Widjaja & Takahashi, 2016).

The first step involved setting up the codes that had been identified as individual cards in the network tool. Once this was complete, they were moved around and clustered into naturally emerging 1st order categories. Once the categories were satisfactory, there was around of coding within the categories to see if any sort of subgroups emerged.

For example, one broad group that emerged was around the factors that guided decision-making. First the codes were embedded into a category called “DMC” which was short for decision-making criteria, and once this was in place, there was grouping and hierarchy done within this category. Since this was cross case analysis, all codes from all participants that fit the description of a factor that influences decision-making was part of this group. Within the group, with the network tool continuing to serve the purpose as a virtual affinity diagramming tool, further analysis was carried out which included identifying if some codes were part of broader themes. An example of how this was done is indicated in Figure 9 on the next page.

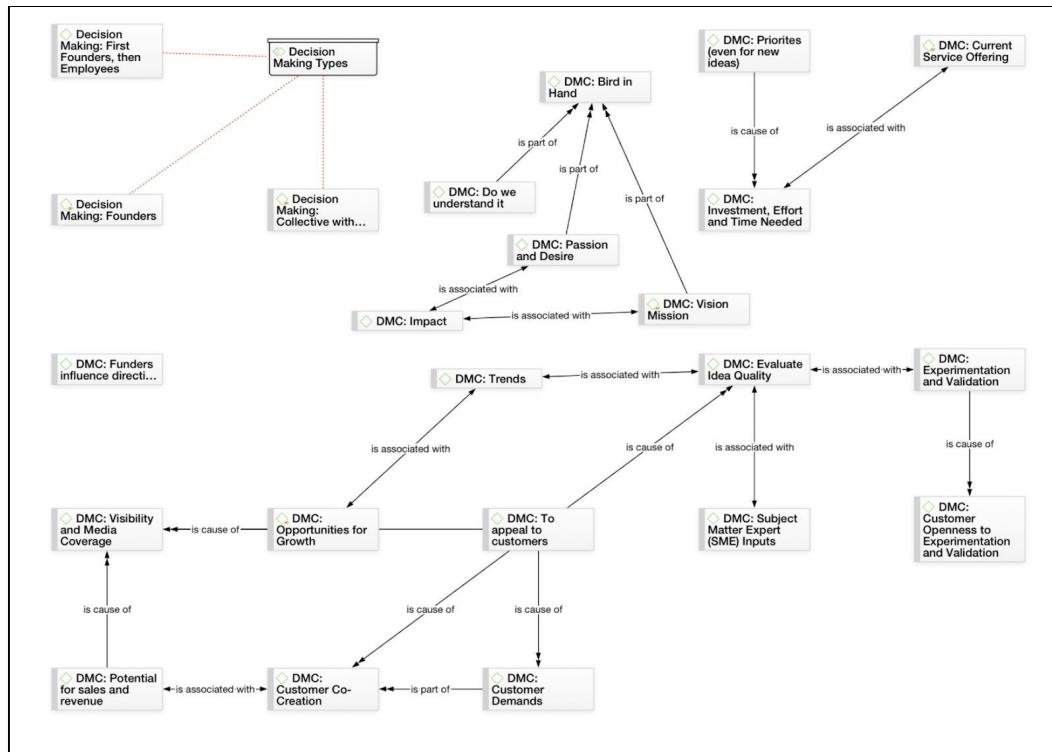


Figure 9 - Example of using network tool to create code groups and categories

As the grouping process continued, the indicators for links in the two core theoretical constructs began to emerge. These indicators were then additionally coded and captured as separate links and formed the basis of the key findings. Figure 10 on the next page indicates an illustrative section of this analysis process, starting from the first order coding, all the way to the key themes and aggregate dimensions that define the findings in the next section.

Each of the 1st order codes was obtained from categorizing direct quotes from the respondents to the case study interview questions. The commonality in themes and overlap in code nomenclature was addressed during the cross case analysis process

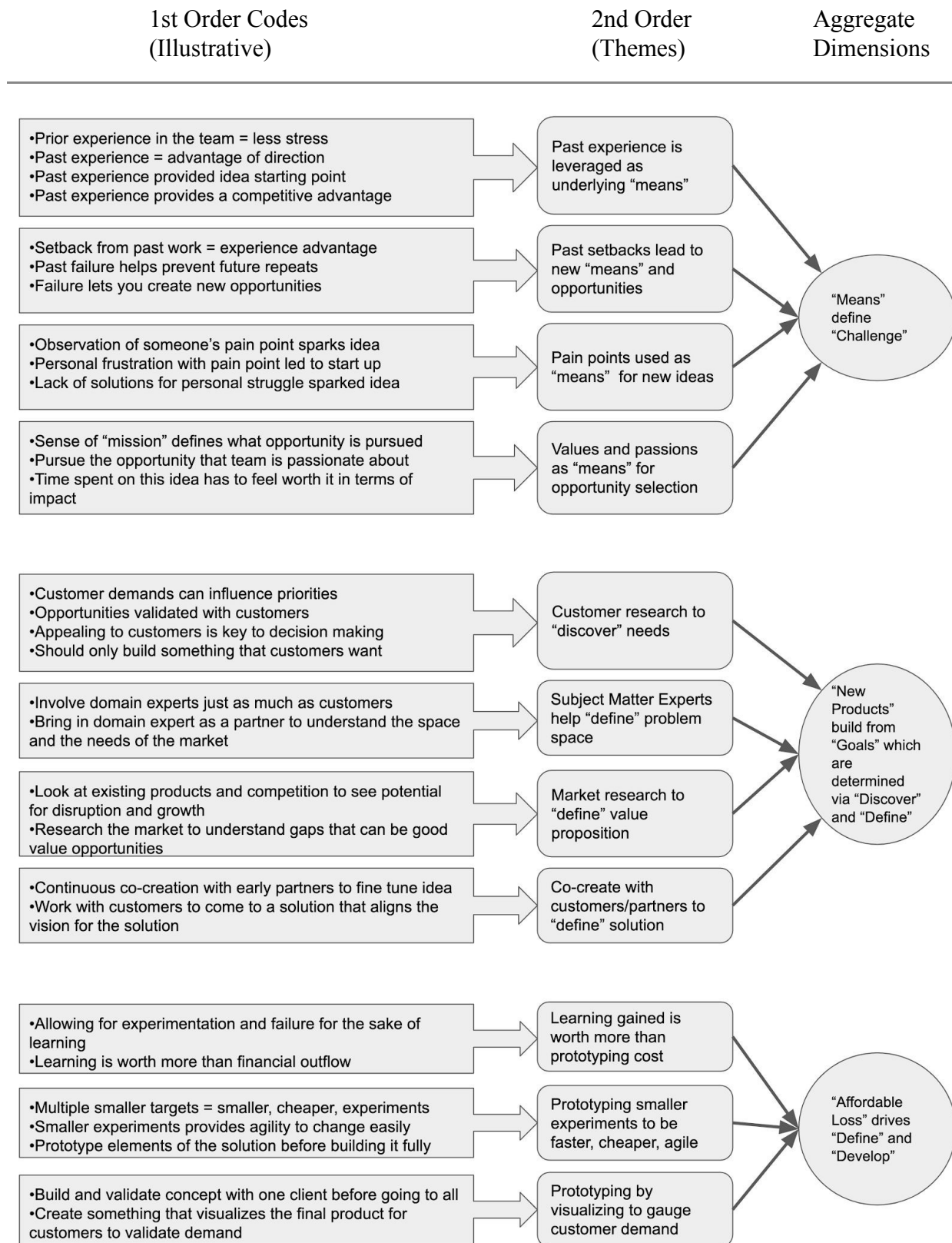


Figure 10 - Sample of Data Structure

The final set of insights gathered from refining all of the data and using the affinity diagramming method focused on answering the key research question to uncover the links between effectuation and design thinking. In addition, since the underlying theoretical foundation from existing research on effectuation and design thinking had been well established, it was interesting to see whether these phenomena were in line with theory when they played out in practice. The key elements showcased in section 4 includes these empirical outcomes that support existing theory while also showcasing findings that form the basis of new theoretical understanding.

3.5 Research Timeline

The research process began in April 2019 with the finalization of a research plan and research questions. A pilot interview was conducted in May which helped further refine the research questionnaire. Field research continued till August and was accompanied by a literature study that occurred in parallel. The data from primary and secondary sources was analyzed and juxtaposed during September and October, with the key findings and the remainder of the report being completed in November. Following the submission key findings were validated with participants who were given an opportunity to reflect on whether the findings matched their experiences.

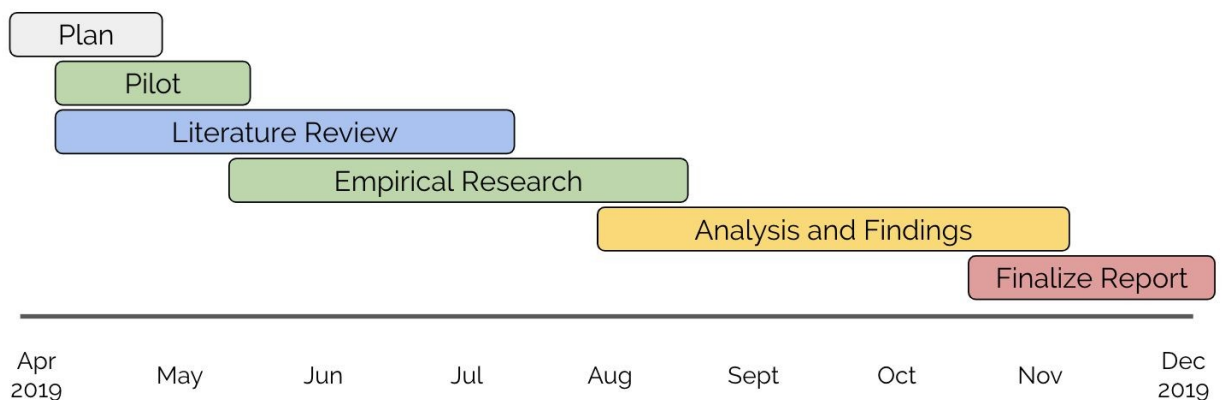


Figure 11 - Research Timeline

4. Findings

4.1 Effectuation and Design Thinking in Startups

A consequence of structuring the research with a focus on determining the existence of links between effectuation and design thinking was that it indirectly validated the existence and application of these theoretical constructs in practice. Most entrepreneurs in this research had not encountered effectuation as a concept, but several of them naturally applied its principles in the way they worked. As one first time entrepreneur, working in the education sector remarked, when the effectuation principles were explained, “oh, that is very much like what I think”. This was echoed by another first time entrepreneur working in the marketing space who said, “what you just said, it sounds exactly how we are doing it”. It was clear that this held true even for experienced entrepreneurs as one respondent who was entering into the startup space based on a very niche background related to geoscience could not help but exclaim, “wow! I just kind of unknowingly said all of those five things”.

Compared to effectuation, design thinking was better known among respondents. However, very few respondents applied design thinking directly to their work. Those that did apply it, did so from the perspective of design being an underlying mindset that drove everything they did. This meant a greater focus on being user/customer centric, having empathy, iterating and prototyping at various stages of the project rather than following it as a fixed process.

To go with effectuation and design thinking, some entrepreneurs also mentioned other approaches and theoretical constructs for the way they worked, these included lean startup, blue ocean strategy and agile methodology.

4.2 Links Exist Between Effectuation and Design Thinking

The research found Five links between the specific elements of effectuation and design thinking. It also found two links that connected effectuation and design thinking at a broader, conceptual

level. Overall, the link between the two concepts was best summed up by how one serial entrepreneur responded in the research, “design thinking is one application of effectual thinking. The effectual mindset is what you basically need for doing design thinking and they are somewhat overlapping concepts”.

The same serial entrepreneur also discussed how, “design thinking is a process, effectuation is a bit of a process. One comes from design realm of how to create products, or creating something new while the other is from understanding entrepreneurs”. In line with that, for the remainder of the findings section, effectuation is defined by the five principles and how they work together in action as a process, as defined by the image below.

The rest of the findings section will cover the key findings and in order to standardize the terminology, the findings around design thinking, will be defined by the names given to the steps in the 2019 version of the Double Diamond indicated in Figure 6 in section 2.3.3. Similarly the terminology used for effectuation will be defined by the steps in the effectual process indicated in Figure 2 in section 2.2.2

4.3 “Means” define the “Challenge”

Challenge is the starting point of the design thinking process, which usually involves a selected Project Brief and Problem Space. For effectual entrepreneurs, the means are the starting point in any challenge and the starting point for identifying any opportunity to pursue. Based on the respondents, it is clear that they assess their means - usually skills, resources and knowledge - they have available at their disposal before defining the challenge and considering what opportunities to pursue.

4.3.1 Past experience is leveraged as competitive advantage

It was clear from the responses that the assessed means for an aspiring entrepreneur included knowledge gained from past experience. This knowledge is seen as a competitive advantage that can be leveraged towards a new challenge. One entrepreneur in the social media and technology domain, working on his second entrepreneurial endeavor, talked about how his extensive

background with a large technology firm meant he “knew how difficult is going to be to design these kinds of systems that would be competitive with a new legislation”. Along the same lines, another entrepreneur, running her first marketing related startup, described how during her last job she “realized that no one is doing this in Finland, and in a way that it could be done. So why shouldn’t we do it?”

Another first time entrepreneur, running a startup in the creative and tech domain, talked about how the idea for approaching a challenge differently came to him during a project at his previous job where he “could see that it was not about the tool. It was about the fact that they sat there and they could instantly see that they can create something.”

4.3.2 Past setbacks lead to opportunities

When entrepreneurs assessed their means, they also considered past setbacks and learning from “Lemonade” moments among them and believed this led to identifying new opportunities. Multiple respondents talked about how their startup ideas were based on learning from work they have done in the past, particularly around a past failure they had encountered and learned from.

One experienced entrepreneur, with many years of experience both running and mentoring other startups, commented about how past experiences shaped how he approached his current education technology venture to the point that

The one thing that we actually understood was that none of the processes that we knew from prior to starting this project was good enough to deliver...we actually had actively forget everything we had done, and start everything from a clean slate.

Another entrepreneur who had experienced the failure of a startup when it filed for bankruptcy said the learning from that experience gave clarity about what needed to be done in his next venture whether it was to “put more emphasis on the marketing side earlier than we did, be less conservative and not just focus on Finnish markets” or understanding that he needed to take better stock of his means and “put in more effort bringing in a co-founder who had experience in B2C marketing.

One serial entrepreneur commented on how past failure and the lemonade mindset to learn from them is great because it meant “we understand something now that we did not at the start”. He also added that “these startup failures have helped accelerate my career”

4.3.3 Personal pain points lead to opportunities

Another aspect that is assessed as part of the means are the opportunities stemming from a personal experience of a pain point. One tech entrepreneur, while brainstorming potential markets for his third startup talked about how he and his co-founder remembered their experiences in a past entrepreneurial endeavor and focused on their own pain points from using their own service, touching on how “the customer experience is really bad. You will get scammed. The time and the efficiency...it should be easier.” This led directly to creating this entrepreneur’s current startup.

Along the same lines, one first time entrepreneur, in the second year of a health and fitness related startup got into it as “we realized there is no such service in Helsinki and that was coming from a struggle that we were both experiencing”. Similarly, another first time entrepreneur in the hospitality and logistics domain, took his own disastrous experience while traveling as the starting point. As he described it, in the process of navigating his pain points and overcoming it, he “just became frustrated with those existing solutions back then. And out of that frustration, basically, long story short, we then started the company”

4.3.4 Values and Passions influence opportunity selection

The research revealed that entrepreneurs choose their challenge and the kind of opportunity they want to pursue based on their understanding of who they are and their values, passions and self defined missions, which form the “Who am I” part of assessing “Means” or “Bird in Hand”. In that case of one female entrepreneur in the third year of her marketing startup, she talked about how they look at “what kind of services we are offering, and how we can grow, what we want to be what our mission will be, and what we want to achieve” as being the defining factors in what they pursue next, whether as a product or as a feature offering to customers.

One first time entrepreneur in the creative and tech domain, talked about how the most important thing was this feeling his work was having an impact by indicating how “Whatever we do, the key is that the time of our lives that we spend, it feels worth it. That is the biggest measurement that overrides everything that we do”. This was in line with how for one student entrepreneur, in the first year of her first startup, passion was described as a driving force - “we thought if we go for it, it will be lots of time and effort, and for that we should feel passionate about it”.

4.3.5 Potential for impact influences opportunity selection

The idea of pursuing a “Challenge” aligned with one’s passion or vision also extended to the perspective of the potential impact of the startup as well, particularly around solving a pain point for people and making a difference. One first time entrepreneur from health and fitness domain talked about how he got into the startup because

what is very important for me is that it actually has a positive impact on people's lives. And it does not add to the consumer, society, and its ecological, and eliminates food waste, and it makes people's lives healthier. They're happier because you solve really a big pain point for a lot of people

Another first time entrepreneur in the hospitality and logistics domain talked about how a consideration is how “no matter which direction you're shifting the business, is this something that actually contributes contributes to solving an actual pain”

4.3.6 Revisiting “Means” to reorient when “stuck”

Almost all entrepreneurs had situations where they suffered a setback or got “stuck” on their entrepreneurial journey, ie. encountered a situation where the path forward was either ambiguous and uncertain, or there was not one that was apparent. One way in which they reoriented themselves and found ways to push forward was by revisiting their “means”. They took stock of their current “means” in the stage of the process that they were in, and readjusted what they would do on the basis of their capabilities (and that of their partners), their vision and their values. In these situations, the vision was often broad, as indicated by how the entrepreneur from the marketing domain said “underlying goal was to be the number one in Finland, but without a rigid definition on what that looked like. This guided decisions.” Similarly for one education

technology entrepreneur, the key deciding factor was “pedagogy first, everything else comes next” while for another education technology entrepreneur, the driving force was around “developing how people learn rather than teaching more things” and in both these cases, these underlying values guided decision-making to push past any ambiguous or uncertain situations.

4.4 “New Products, Markets and Firms” build from “Goals” which are determined via “Discover” and “Define”

Discover and define form the first divergent and convergent phase of the double diamond process. For effectual entrepreneurs, “Pilot in the Plane” implies focusing on the elements that can be controlled to create new products, markets and firms rather than trying to make predictions. Based on the empirical research, it is clear that entrepreneurs use research in the “Discover” and “Define” phases of design thinking to manage risk and identify suitable “goals”. These goals, when refined and defined, lead toward “New Products, Markets and Firms”. In fact, some entrepreneurs combine their understanding of the means with their identified goals, and their assessment of potential products, markets and firms and use this as a basis to define skills or knowledge that they need to learn themselves. This is best highlighted by how the entrepreneur from the creative and tech domain joined an entrepreneur training crash course as he “wanted to understand what it takes to create a business and what we need to know (and identify what we do not know)”

One tech entrepreneur provided a contradictory view to the fact that the research that characterizes “discover” and “define” can sufficiently determine “Goals” that translate to “new products, markets and firms”. He believed that they could not rely on research to develop completely new ideas and that sometimes it required a leap of faith to create something truly innovative. This was highlighted by how he believed

it is much more difficult to navigate and do the user research, because people do not know yet what you are going to give them...trying to explain to people what Facebook would be in the, in the in the 90s, would have been somewhat difficult

This is a valid opinion, especially if the entrepreneur is seeking to create a disruptive solution. However, for the majority of respondents, the value of “discover” and “define” whether in the form of research or co-creation was an invaluable element towards determining the problem space and which new product or market or firm they should pursue. The rest of this section will look at specific ways in which they incorporated these elements.

4.4.1 Customer research to identify needs and goals

One way that entrepreneurs manage risk in their choice of opportunity and goals to pursue, is via engaging in customer research as a way of assessing needs, demands and pain points. This was best highlighted by the entrepreneur in the hospitality domain who talked about how they “got in touch with hotels and the hospitality industry...and understood from their feedback that one solution was better”. This was not an isolated case either, as the entrepreneur working on a social media related enterprise confirmed that he “had been interviewing people, podcasters, listeners...so had some amount of user research that justified the need”

In each of these cases, the research was helping mitigate risk by leveraging customer insights to find the right opportunity to pursue and define the goals. The research done was more than just casual conversations. For example, the entrepreneur working on the health and fitness startup discussed how they “did a lot of in depth interviews with people trying to understand what is their shopping behaviour? How much would they pay? Would this fit into their daily lives?”

4.4.2 Subject matter experts (SMEs) help clarify the problem space and goals

This finding is self explanatory - the entrepreneurs contacted experts in their chosen domain to better understand the problem space and in turn achieve a better outcome. This often went hand in hand with understanding the customer as well, as highlighted by one student entrepreneur who stressed the importance “to keep being involved with both the user and the expert”. The goal to do this was to better understand the problem space and it was accomplished this via “some workshops involving the target group”. The health and fitness based startup entrepreneur also

emphasized how they brought on board an “expert from fitness and sports. He has experience about the problems he sees through his work on the user side”.

4.4.3 Market Research to Clarify Value Proposition

Some entrepreneurs do extensive market research to determine their unique value proposition and also understand their competitive advantage. They consider several factors to do this.

Existing products and competition

Multiple entrepreneurs wanted to know more about existing products in the domain and how they could do something better than the rest of the market. The entrepreneur in the hospitality sector talked about how they worked on “understanding that existing solutions were not working as they should and whether there were alternatives that worked better”. Similarly, the entrepreneur in the social media space talked about how they had “been looking around the existing solutions - what do they provide and what are the gaps? Then we identified that this thing is not done yet and we also had found some similar companies”

One first time entrepreneur in the geoscience domain mentioned that as part of his process he “would first look at what, what is the market? What is the opportunity for whatever I'm creating, or whatever I'm changing in the product, or the service I have?”

Potential for growth or disruption

After assessing the competition, the common reason to conduct market research was to assess the potential for growth and disruption, which in turn translates to overall success for the entrepreneur. One tech entrepreneur talked about how their exploration for new offerings is growth focused and driven by asking “how much does this bring growth, if it even does bring growth? Does this accelerate, accelerate our growth?”. He went on to add the importance of looking at growth potential as being because “growth is the kind of the main metric to all startups, if you're not growing, then there is no point doing in what you are doing, especially if you have VC money in your balance sheet.”

For the entrepreneur in the marketing domain, one element that determined the potential for success and growth was whether it was “a really hot trend, something that is getting media attention” as this would validate the need and also fuel potential customer demand. In a similar vein, for the serial entrepreneur in the emerging tech space, the thinking revolved around “What can be an industry disrupter? What can be something new and exciting?” and determining this by looking at the market as well as potential customer demands

4.4.4 Co-creation of “goals” with potential customers or partners

Some entrepreneurs do not just look to do research with customers to discover a market opportunity, they also find opportunities to co-create with them to better define the problem space and a vision for the solution. One first time tech entrepreneur talked about the importance of involving the customers and how his co-founder “met 30 different investors and potential customers within the first month.” and based on these meetings “built a relationship with key customers and with interviews, observations and iteration, continuously co-created with them. Similarly, the entrepreneur from the Geoscience domain discussed how “customer requests are a huge driver in how we envision...we see what key customers are saying and work with them” to define the potential ideas for a solution further. This is discussed in more detail in the following section, 4.5, which dives deeper into the elements that influence partnerships.

4.4.5 Research as a tool to manage risk

Some entrepreneurs considered research into the current market state, competitors and trends as a tool for managing risk from the external market as it allowed them to take an informed approach to determine if there is a suitable target market and sufficient competitive advantage. This was highlighted by how the serial entrepreneur focused on “doing the research to ensure a really unique competitive advantage. If doing something with risk, this will help to move forward”. The geoscience entrepreneur had similar thoughts

I would first look at ‘what is the market?’ or ‘what is the opportunity for whatever I’m creating?’. Then I’d be able to evaluate risk based on that opportunity and look at how prepared we are as an organization.

Research with end users and potential customers also helped minimize risk as it allowed the entrepreneurs to identify the customer needs and enabled the development of a solution that had a validated demand. One respondent commented on how, at a simple level “this gives us more confidence when applying for funding”. Similarly, one serial entrepreneur talked about how “for our new line of business, we have validated approaches on how to acquire customers because we understand their behavior” and he went on to add that “when we design things, the design thinking method, in itself, gets rid of a lot of the risks”.

4.5 “Interactions” and “Commitments” are influenced by “Challenge”, “Discover” and “Define”

Entrepreneurs look to align themselves with partners based on characteristics influenced by the first half of the double diamond structure.

4.5.1 Picking partners who add knowledge to tackle the problem space

Based on their understanding of their “means”, entrepreneurs bring in partners who provide knowledge, skills and capabilities that aid in tackling the problem space better and supplement the “means” that the entrepreneurs already possess. The entrepreneur in the geoscience startup talked about how “rather than us creating everything ourselves, we partner up with the right kind of partners who provide a unique service or a unique model, or even a market” as the factor for determining how he identified partners

Similarly, the entrepreneur in the creative tech domain relied on partners to help create video marketing - “I did not have the skills for the video and it takes a lot to communicate a lot in a short video, so I spent six months working with other designers in co-creation workshops”. This was also echoed by the hospitality and logistics domain entrepreneur who talked about how “if something is not part of the core strategy for the company, we bring in someone who knows how to do it better and can build it more cost effectively”

These sort of “interactions” and “commitments” include partners who are selected as they are aligned in a common vision or mission and bring their own expertise to aid that. This was

highlighted best by how one entrepreneur in an education technology startup talked about how a good partner is someone whose “vision of the world is similar...and they can offer you key expertise that matches what you do”

4.5.2 Prefer partners who are open to experimenting and iterating

Partners who are patient and open to experimentation and iteration are preferred as initial customers as it enables better opportunities to co-create an effective product, market or firm. One of the education technology entrepreneurs believed that co-creation was vital because

you need the feedback you get when you put your product in front of people who look at it from a different perspective than we do. And they can give us valuable insight on how they're perceiving the value and how to build more value out of it

Similarly, another of the education technology entrepreneurs talked about how the startup “does a lot of co creation with partners to create their understanding that is a potential market” and once this market is identified they then “do a lot of coaching and business planning”. There are also cases where the experimenting with customers leads to creation of new opportunities for them as well. This is best highlighted by the entrepreneur in the architecture domain who is “designing a new service for a customer that is going to be a new business for them as well. Going forward, we'll be partners for future developments in this business around Finland”

Collaborating partners are happier, and contribute to better sales

One of the repeated assertions from entrepreneurs about the benefit of working with partners who are happy to experiment and co-create was how their involvement makes them more invested in the process. These partners feel heard and are happier, which translates to better sales once the finished solution is launched. As one tech entrepreneur put it “Customers are happier when they're involved, so we ensured we got them involved as much as possible. This helped to later make sales as well.”

The geoscience entrepreneur also focused on how co-creation helped build confidence with customers as “what we gained was both product knowledge of customer behaviour and understanding, and thus also build trust with the customer saying that, you know, we're actually

trying to build something together”. Another of the tech entrepreneurs also supported this as he said “Interviews, observations - talking, feedback, iterating - we continuously co-created with customers and build a relationship. This helps in sales as well because it is easier to sell something co-created.”

Collaborating Partners allow for faster and easier concept validation

Another benefit of having partners who are open to experimenting and iterating is how it allows entrepreneurs to go through faster and easier cycles of validation of a concept before deeper investment of resources into further development. One tech entrepreneur felt that the conventional approach of “talking to users and testing is very time consuming and you are running out of time” and for that the best solution was “to have access to key partners who can help with co-creating faster”. Another tech entrepreneur felt that “having good relationships with key customers means that we can always come back and get more interviews, observations, feedback and iteration in a faster way”

Collaborating with partners as a way to avoid getting “stuck”

In cases when entrepreneurs got into a situation with no clear way forward and high levels of ambiguity and uncertainty, some believed that working with partners would be a useful approach to push past and find a new direction. This was best highlighted by one education technology entrepreneur believed that leveraging interactions and commitments with customers and partners was vital as a tool to get “unstuck”. In his own words “every week, we try to talk with as many potential customers as possible and get new inputs. This means that the team is never stuck as we’re getting information on all levels from the customer to develop the solution”. Another education technology entrepreneur talked about using customers as a way of validating and testing their biggest assumptions.

4.6 “Affordable Loss” is the mindset that drives “Define” and “Develop”

Entrepreneurs approach risk by focusing on affordable loss they could manage in the event of a negative outcome. In this research, affordable loss was the driving factor behind prototyping and

iterating, the same process that is followed in the divergent and convergent “Define” and “Develop” stages of the double diamond design thinking process.

4.6.1 Learning gained is valued higher than cost of prototyping

Multiple respondents indicated that they preferred to build prototypes and test assumptions as the learning gained from even a negative outcome was worth more than the resources expended to build the prototype. The entrepreneur in the hospitality space said

They are experiments, and we already know that most of them will fail. But with that failure we will learn something that will help us make another experiment that will then enable us to find, for example, a go-to-market, scalable way of customer acquisition.

This was echoed by the serial entrepreneur who said he “considers it to be a learning experience when we fail. We do not see it as a failure as the goal is to understand the market better and the dynamics...We consider this learning to be a victory.” Similarly, the entrepreneur in creative tech also stressed the importance of testing assumptions and said the goal is that “This lets us know which features are our big selling points, which are our stars. The features that users use a lot but also have a lot of feedback on, those let you learn a lot more.”

The creative tech entrepreneur valued the learning so highly that he allowed others in the startup to make mistakes to the extent that “you know something is wrong but you let it happen, just because when they do it and they see the response to it, they learn something new. That learning is more valuable”.

4.6.2 Prototyping in smaller experiments to be faster, cheaper and more agile

For most entrepreneurs, the preferred approach to prototyping involved breaking down an idea into smaller experiments that could be carried out faster, cheaper and allowed for changes in the product in a more agile way. For example, the geoscience entrepreneur said that

I try and break up the problem, rather than tackling the entire thing in one go. I'll see if I can do 20% of it and see how we do. If we do really badly, then I would know that maybe the market is not ready to accept that or maybe it is not the right fit.

Similarly, one of the education technology entrepreneurs talked about how they “start with big milestones that we need to achieve but break it down into smaller sections and then once more into even smaller experiments. Running with these small experiments means that if we realize after one month that our focus needs to shift, we can change the direction more easily”. This was also reflected in how multiple participants responded that they like using elements of the lean startup method, which focuses on building prototypes and iteration.

4.6.3 Prototyping by visualizing a solution to assess customer demand

A couple of entrepreneurs started off this prototyping and validation even in the early stages of an idea, by visualizing the solution as a means of assessing customer demand. For example, the creative tech entrepreneur started with a visualization

for the sake of having a prototype just to be able to show people out there that there is such a new thing. For people it is hard to imagine what you’re talking about without a prototype. To be able to gather resources to build anything, we needed a quick prototype and for that one of the best is visualizing.

Similarly, one of the education technology entrepreneurs also started with a video describing the product which they just “put it online and just try to do some pre sales and see if anybody is interested in that.” In both cases, the entrepreneurs were using a visualization of a solution very early in the process to gain a better understanding of customer needs, demands and also get a reasonable gauge of customer interest, with a much lower expenditure in resources than they would have if building an actual prototype.

4.6.4 Affordable Loss and Prototyping to Minimize Risk

Multiple entrepreneurs commented on how prototyping allowed them to minimize risk. This was primarily due to how spending on smaller experiments (as indicated in 4.6.2) and visualization to assess demand (as indicated in 4.6.3), allowed them to validate assumptions and validate demand before expending resources to develop a solution. One tech entrepreneur discussed how “before we build the technology, we will model it and go to the customer with mockups to show what it would be like and validate”.

Similarly, the entrepreneur from the hospitality domain talked about how “no matter if it is a product feature, or go to market tactic, or even a strategy shift - we will create a hypothesis that is measurable and time bound, and conclude from research whether we should take it forward”. This meant that the resources expended were only for testing the hypothesis rather than building the solution, which helped minimize risk.

Building smaller experiments was considered a good way of mitigating risk as it was a lower cost expenditure. The geoscience entrepreneur talked about how they “try and break up the risk into smaller chunks. I will try and prove it first, before we scale”. One entrepreneur who specialized in emerging tech talked about how his “philosophy or approach to business solutions or solving business problems is to create a solution and prove that it can be done. So when we go to people, we go with a proof of concept or prototype”

4.6.5 Supplementing “affordable loss” with a safety net

A couple of entrepreneurs focused on having a stable, client focused, design business as a way of providing a safety net that could propel their entrepreneurial endeavors as well. They believed this stable core business reduced stress and allowed for greater experimentation. This was highlighted by how the geoscience entrepreneur had “reached a stable core business with ongoing paid projects which supported all the learning, experiments and proof of concept projects”. Similarly, the marketing entrepreneur, “had an ongoing business and was able to use that as a safety net to do new things”.

4.7 Iteration in “Develop” and “Deliver”, as well as iterating the product, is driven by “Leveraging Surprise”

Going hand in hand with the affordable loss driven prototyping, is iteration of the solution, which is driven by “leveraging surprise”. The surprise element that can emerge from setbacks and failure is welcomed by entrepreneurs as essential for learning and building better products. In this research, several respondents believed that setbacks are an expected part of the entrepreneurial journey which have to be handled like just another business decision.

The entrepreneur from the geoscience domain believed that “initially it can be daunting, but experiences are a good teacher and you can figure out ways that things can be resolved”. He also talked about how “You realize over time that the peaks and troughs are expected and there is no setback that is permanent”. In a similar vein, one tech entrepreneur talked about how in a setback “you’re in damage control for some time but then you create a strategy for it and deal with it like any other business decision. I do not see it as any different to running a business”

The mindset of expecting setbacks and quickly reacting to them as a way of moving forward was also expressed by the health and fitness domain entrepreneur, who said “of course setbacks are bad, but you have to keep the bigger picture in mind. This happens. Now think about how to avoid it next time”

4.7.1 Every problem or setback is a potential opportunity

For some entrepreneurs, it was not just that setbacks are expected, but that no setback could be considered a complete failure as every problem was a potential opportunity. This was best highlighted by how one of the entrepreneurs from the education technology domain said “it seems like an irony, but whenever you think big setbacks are really massive, there is a great opportunity right around the corner”. Even for beginner entrepreneurs, this was something they quickly learned and understood. A good example of this is how one of the student entrepreneurs who faced a setback in the early stage of her startup said “we were concerned and confused, but having seen other entrepreneurs on a similar journey go through similar changes, we realized it is ok to pivot to a different opportunity”

4.7.2 Learning to avoid repeating the same mistakes

These entrepreneurs believed that even the biggest setback can be a successful learning opportunity to iterate and build something better while also avoiding repeating the same mistakes. Several of the entrepreneurs had faced setbacks and had learned to deal with, like for example, how the entrepreneur from the creative tech company faced a big setback but “quickly

moved on, saw where we went wrong, upgraded the plan and improved communication, collected more traction and then it clicked”

Along the same lines, one tech entrepreneur highlighted how much the learning from setbacks gets ingrained into how they deal with situations going forward, as they said

When any setback happens, you are trying to avoid similar things happening in the future. You usually come up with a way to deal with it...you know how to prevent it from happening next time - and you integrate this into the whole organization process. You create a change that allows you to reach goals and avoid setbacks at a system level.

4.7.3 Setbacks lead to better outcomes and opportunities

Along the same lines as section 4.3.2, which talks about how entrepreneurs treat past setbacks as the starting point for new opportunities, entrepreneurs “leverage surprise” from not just themselves but from those around them as well, to do better in their current endeavor. For example, the entrepreneur from the health and fitness domain talked about how “even with really big down points, we have learned and worked on it and afterwards thought how that setback was a really good thing because we went forward the right way after that”

This mindset was shared with beginner entrepreneurs as well, especially in situations where it was possible to learn from someone else’s setbacks. As one student entrepreneur remarked “those who went through those things already, they were emphasizing that that is where really need to put in the effort. So we were just kind of learning from mistakes of others.” Sometimes these setbacks led to very specific learnings that were a direct consequence of the setback that was faced, like how one education technology entrepreneur who had faced a setback in a previous startup, said she learned to “really be secure with cash balance because funding takes time” and applied it to her current startup by making a “more concrete revenue and expense plan that allowed to foresee when we need to secure funding by”.

Learning from setbacks and creating changed or better outcomes was also expressed to be an effective way of managing future risk. As one entrepreneur said, “the ability to learn and adapt means there is no need for a plan B”. Similarly, the entrepreneur from the hospitality and

logistics domain talked about how “for experiments, the goal is just to do the experiment as quickly as possible, learn, and then based on that be able to iterate your next moves or the next experiment. So that way actually, you never have to get to any backup plan”

4.8 Visualizing the Links between Effectuation and Design Thinking

Based on the findings from the research described in sections 4.2 to 4.7, Figure 11 on the next page illustrates how the two concepts influence each other with the numbers indicating the corresponding sections that describe the links. This figure will also form the basis for the discussions in section 5.

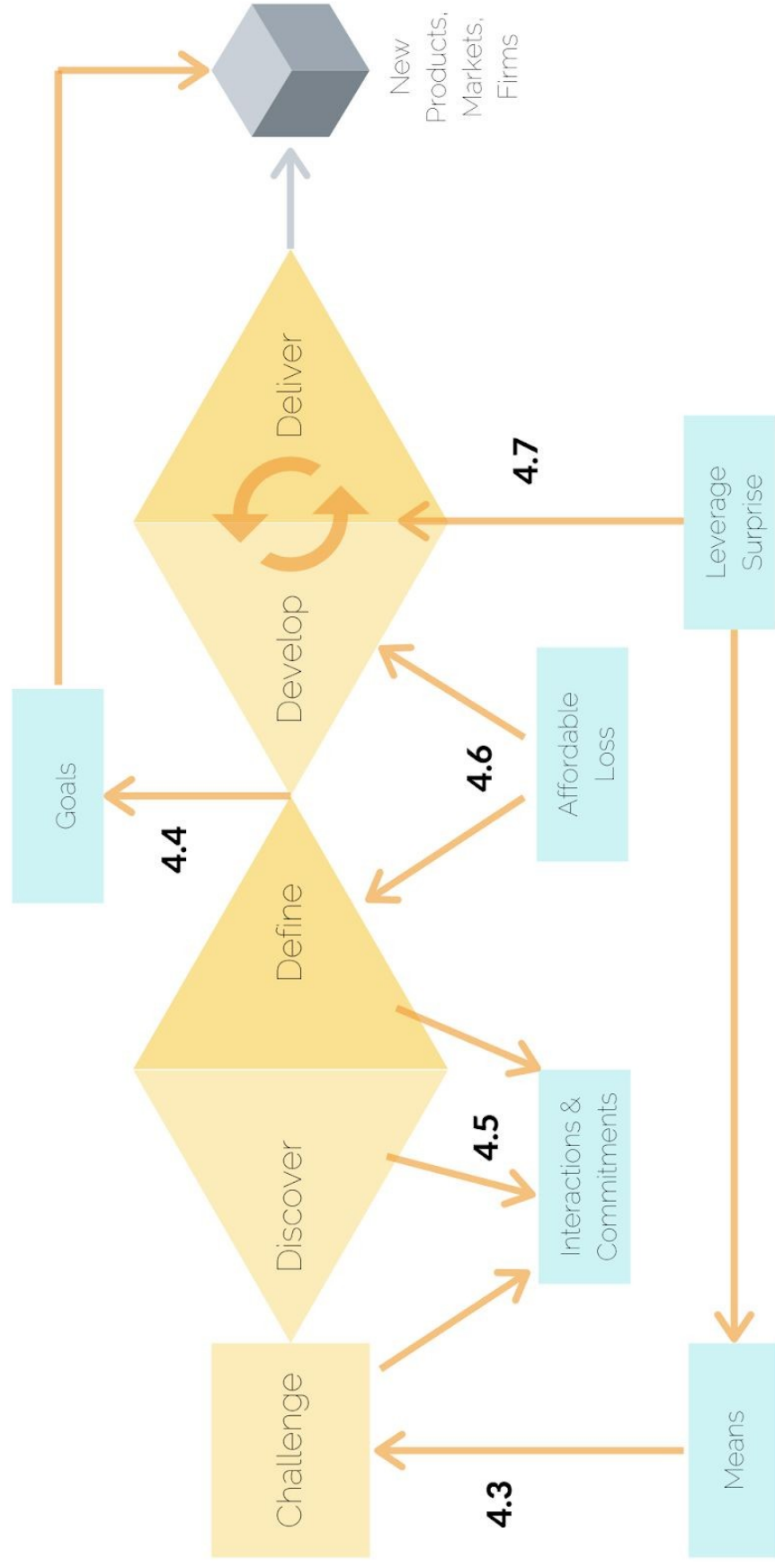


Figure 11: Visualizing the Links between Effectuation and Design Thinking

5. Discussion

Overall, this research combined an extensive review of existing theoretical content and then supplemented that with empirical research to answer the core research question of “*what is the link between effectuation and design thinking in the entrepreneurial process?*”. First, the key insights from the research will be discussed by bridging theory with empirical research.

Following that, the implications of these insights will be covered. Finally, the section will look at the limitations of this research and avenues for future research as well.

5.1 Key Insights

In the initial research by Sarasvathy (2008), her findings seem to indicate that effectual logic is more prominent in the early stages of the startup life cycle while more causal approaches come to the fore as the startup develops. This seems to suggest that the two-concepts co-exist but as inverses that are not directly linked. My empirical findings contradict this, by indicating how effectuation and design thinking are linked in early stage startups.

Looking into more literature that was covered in section 2, in subsequent theoretical constructs after the aforementioned research by Sarasvathy, there exist initial hints of links between effectuation and design thinking, as explored in research question. Reymen et al., (2015) establish that effectual and causal thinking does not exist in a vacuum, even if one is presented as a contrasting juxtaposition to the other in effectuation theory (Sarasvathy, 2001). Tschimmel (2012) suggests that design thinking relies on the designer’s capacity to consider available resources as well as the constraints and opportunities, a description that is similar to the considerations in effectuation. More recently, Romme and Reymen (2018) suggest that effectuation is sometimes considered an example of design science work in the entrepreneurship field. When responding to criticism of their construct, Read et al. (2016) go on to suggest the need for further empirical research to establish better theory, particularly around deliberate practice and the link with predictive strategies. With the established need for research and multiple suggestions of links from theory, the empirical research served as a deeper, real world

exploration of the existence of links between effectuation and design thinking in the research context of early stage startups in Finland.

Building on the traces of links between effectuation and design thinking in existing literature, the research findings serve to definitively answer the research question in the selected context and establish that **five clear and observable links exist between the two theoretical constructs**.

These links are as follows:

- “Means” assessed by the effectual entrepreneur, define the “Challenge” that they pursue through a design thinking approach.
- An entrepreneur identifies and refines directions for “New Products, Markets and Firms” by defining “Goals” which are clarified with the aid of the divergent and convergent “Discover” and “Define” phases in the design thinking approach.
- An entrepreneur seeks out partners for “Interactions” and “Commitments” based on the needs that emerge from the “Challenge”, “Discover” and “Define” phases of the design thinking process.
- An entrepreneur chooses the solution to pursue and how much to invest into a direction in the “Define” and “Develop” phases based on the effectual principle of “Affordable Loss”.
- An effectual entrepreneur uses the Lemonade principle to “leverage surprise” as a driver for iteration in the “Develop” and “Deliver” phases of a design thinking process.

The evidence for these links can be found in detail in section 4 with the “Findings” and they are visualized in Figure 11 on page 61. The rest of this section will discuss these in further detail while comparing with existing theoretical constructs.

5.1.1 “Means” Linked with “Challenge”

In existing theory, when defining effectuation, Sarasvathy (2008) explains that it starts with an assessment of existing resources and constraints and an understanding of possible opportunities that stem from a starting point of reflecting on “who I am, what I know, who I know”. This is closely aligned with the suggestion by Tschimmel (2012) that design thinking relies on the

designer's capacity to consider available resources as well as the constraints and opportunities. In addition this is also linked to the first phase of a design thinking process, which, according to Grots and Creuznacher (2016), is focused on capturing the status quo and the current context as the starting point

From this author's own practical experience, design practitioners assess their available tools, capabilities and resources in a similar manner to what is described in Tschimmel (2012). This is used to create a "fuzzy" picture that acts as their starting point for their hypotheses. This is in line with the "inspiration" phase where the opportunity is identified according to the three I's process as per Brown (2008). The subsequent direction and content is determined via an iterative process that leverages these resources to come up with a "problem statement" that is analogous to the achievable end goal that emerges early in an effectual process.

This possibility of a link between the "Means" and the "Challenge" is confirmed in practice by the findings of a clear link between the "Means" assessed by the effectual entrepreneur and the "Challenge" that they pursue through a design thinking approach. This includes the following elements that entrepreneurs

- Leverage their past experience as means for a competitive advantage
- Consider past setbacks as means to generate new opportunities
- Leverage personal pain points as means for new opportunities
- Consider their values and passions as the means to drive opportunity selection
- Also consider their potential for impact when selecting opportunities

These outcomes are supported by theoretical constructs as well. The first point, which asserts that past experience is leveraged as a means for competitive advantage - this is supported in multiple theoretical constructs. First, this is in line with design thinking theory, where actions are often guided by what was learned via prior experience and experimentation (Schweitzer et al., 2016). It is also in line with the findings by Rotefoss & Kolvereid (2005) which indicates that entrepreneurs with prior experience do better.

In addition, the leveraging of setbacks and means to generate opportunities is in line with the findings from Long, Xia, and Hu (2017) about how “fortuitous” discovery of opportunities emerge from alertness to those opportunities and entrepreneurs building from these opportunities rely on the Bird in Hand principle and the Lemonade principle.

5.1.2 “Discover” and “Define” influence “Goals” which build into “New Products, Markets & Firms”

In established theory, in answering the titular question from the seminal paper - “what makes entrepreneurs entrepreneurial?” (Sarasvathy, 2008), the author concludes that effectual entrepreneurs operate through a lens of control which is defined by a belief that the future is shaped by human action. The author defines the “pilot in the plane” aspect driving the “new products, markets and firms” that encompass the overall outcome. This is specifically linked to control, and the idea that by influencing the elements that are within the entrepreneur’s realm of control, the entrepreneur is controlling the future (Sarasvathy, 2008). This is meant to be the underlying effectual logic that drives the other four principles. In literature, there is no clear link that emerges between this element and design thinking.

However, in practice, a clear link is determined as it was found that an entrepreneur identifies and refines directions for “New Products, Markets and Firms” starting with setting “goals” which are determined with the aid of the divergent and convergent “Discover” and “Define” phases in the design thinking approach. Thus to extend the analogy of “pilot in the plane” (Sarasvathy, 2008), it is clear that, in practice, entrepreneurs exercise control by leveraging research to determine an effective course of action. This includes

- Conducting customer research to identify needs and goals
- Consulting with subject matter experts (SMEs) to help clarify the problem space and goals
- Conducting market research to clarify the value proposition, by looking at a) existing products and competition, and b) potential for growth or disruption
- Co-creating “goals” with potential customers or partners

- This is Using research as a tool to manage risk

The first thing that stands out is how the incorporation of diverse sources when performing this research is in line with the assertion by Brown (2008) that a design thinker's personality must possess "integrative thinking" which involves taking a systemic view of things. In addition, the co-creation of "goals" with potential customers or partners is in line with Murdock and Varnes (2018) theorization based on "actor-network theory" (ANT) that the building of partnerships and leveraging of networks causes the entrepreneurial endeavor to be fluidly evolving its goals and context to adapt to the needs of new entities in the network

Overall, the empirical findings linking design thinking to effectuation in the "Pilot in the Plane" aspect of the theory (Sarasvathy, 2008) build on theoretical foundations and provides new outcomes that have not been covered previously in the literature analyzed for this research.

5.1.3 "Challenge", "Discover" and "Define" influence partners sought for "Interactions" and "Commitments"

Sarasvathy (2008) describes how expert entrepreneurs, over the course of their creation process, encounter various stakeholders, some of whom are willing to pre-commit to the solution as an eventual partner. These partners often have some aspect of the "go to market" strategy covered, for example a buyer or distributor. In existing literature on design thinking, this is directly linked to the one of the personality characteristics in Brown (2008) about being a collaborator who embraces the reality of the enthusiastic interdisciplinary collaboration and is open to seeking outside help by expanding the ecosystem and looking for opportunities to co-create with stakeholders. A good entrepreneurial solution considers the outcome of a range of disciplines as a way of learning and leveraging expertise and partnering with stakeholders from diverse domains (such as anthropology or behavioral psychology) can lead to large gains.

This study establishes a clear link with how an entrepreneur seeks out partners for "Interactions" and "Commitments" based on the needs that emerge from the "Challenge", "Discover" and

“Define” phases of the design thinking process. This specifically manifests in the following ways,

- Selecting partners who add knowledge that is required to tackle the problem
- Selecting partners who are open to experimenting and iterating
 - Partners who collaborate are happier and this leads to better sales
 - Collaboration with partners allows for faster and easier validation

These categories provide further clarity to what Sarasvathy (2008) implies when declaring that effectual entrepreneurs focus on strategic alliances to reduce uncertainty and build greater barriers to entry. Having partners on board who add knowledge that is missing from the entrepreneur’s “means” adds to the clarity on how to navigate toward an effective solution. Similarly, having partners who are open to experimenting and iterating, particularly in the form of prospective customers helps create a direct line to the market, that builds barriers to entry for others looking to pursue a similar opportunity space. It also helps reduce the risk as it allows for the building of a validated solution, and this is discussed further in section 5.1.4.

5.1.4 “Define” and “Develop” driven by “Affordable Loss”

In existing theory, affordable loss principle acts as a way of mitigating risk and creating new ways of reaching the market while minimizing the expenditure of resources (Sarasvathy, 2001). Once effectual entrepreneurs have an idea of their affordable loss, they choose to quickly test their hypothesis for solutions. In the design thinking process, this is analogous to the rapid ideation, prototyping and iteration that happens as part of the point on “Experimentation” in the five key characteristics of a design thinker (Brown, 2008).

For design practitioners and effectual entrepreneurs, ideas are rapidly tested and evolved with minimal expenditure of resources. This way of working is linked to the design thinking mindset of being “inquisitive and open to new perspectives and learning” (Schweitzer et al., 2016). This is particularly true in situations where elements of a solution are tested using a method such as “paper prototyping” where with minimal investment, there is a way to generate feedback and iterate towards a better solution. The feedback obtained is far more valuable than the resources

expended to acquire it, thus, in a way, making affordable loss, the foundation of the iterative process.

This link holds true in the empirical findings as well, as an entrepreneur chooses what kind of solution to pursue and how much to invest into a direction in the “Define” and “Develop” phases based on the effectual principle of “Affordable Loss”. With this mindset, entrepreneurs determine that

- The learning gained is sometimes more valuable than the cost of building a prototype
- Using prototypes for smaller experiments is faster and cheaper, and it can lead to greater agility in adapting and evolving the outcome
- Sometimes visualizing a solution can help assess customer demand and gauge feedback

The experimentation that is enabled by an understanding of “affordable loss” helps reduce some of the financial risk, as the concept innately incorporates the thinking behind effective resource management which is required in early stage startups where resources are scarce. It also allows for quick navigation between many possible imagined outcomes towards one that is validated with the minimum expenditure of resources, while still generating opportunities for failure that contribute to more effective long term learning as well (Dew et al., 2009).

5.1.5 “Develop” and “Deliver” driven by “Leveraging Surprise”

The “Lemonade” principle is focused on leveraging contingencies that arise from failed outcomes or unexpected changes in circumstances (Sarasvathy, 2001). This is linked with the design thinking mindset of being accepting of uncertainty as practitioners often enter the process without knowing the final outcomes (Schweitzer et al., 2016).

From a practical perspective, as a design practitioner, this element is a natural part of the process to the point where it is almost taken for granted. Every idea is in an iterative process where every failure or unexpected development contributes learnings that lead to new possibilities. (Brown, 2008) also talks about designers needing to be “integrative thinkers” who can see all the salient and even contradictory aspects of a confounding problem and create novel solutions from that.

This further reinforces the link between this principle and design thinking as dealing with contingencies is a constant feature in any iterative creative process.

This is supported in the empirical research as well, as it establishes how the iterative approach that is a characteristic of the “develop” and “deliver” phases of a design thinking process, is driven by leveraging the surprise element that emerges from setbacks and failures. This was highlighted by how entrepreneurs saw

- Every problem or setback is a potential opportunity
- The value of learning as a means to avoid repeating the same mistakes
- Setbacks lead to better outcomes and opportunities

This is perfectly in line with how, in the “lemonade” principle (Sarasvathy, 2001), the focus is on entrepreneurs being flexible, welcoming the surprise element and adapting to circumstances as they were encountered. This also aligns with the effectual process diagram in Figure 2 in section 2.2.2, where the “surprise” element helps add to the means. It also helps evolve the goals the entrepreneur pursues in an opportunity space as mentioned by Long, Xia, and Hu (2017).

5.2 Research Implications

Now that the findings have been examined through the lens of existing theory to indicate how they support or build on previous studies, this section will cover the implications of these findings as well as describing any potentially new theoretical frameworks that emerge. One of the key drivers for some of these implications emerges from the criticism by Arend, Sarooghi, and Burkemper (2015) that effectuation was underdeveloped and limited in scope but has the potential to become a solid theoretical model. The focus here, as suggested by Read et al. (2016) in response to Arend et al. (2015), is to look at not just how effectuation differs but also what effectuation does better than alternative approaches and to provide a focused approach on how it can be applied.

5.2.1 Entrepreneurs use design thinking as a tool to mitigate risk

In effectuation theory, entrepreneurs approach risk by focusing on affordable loss and determining what they're willing to lose. However, the research revealed that risk was also managed by leveraging elements of Design Thinking. In the findings section 4.4.5, research was uncovered as a tool that entrepreneurs use to manage risk. This was accomplished first via research into the current market state, competitors and trends that helped in determining the problem space in a more informed manner than just making assumptions. This was also accomplished by research with end users and potential customers that helped in identifying what the customer needs were and build the right solution.

In addition, in sections 4.6.4 and 4.6.5, the prototyping aspect of design thinking, as driven by affordable loss, also allowed entrepreneurs to manage risk. The first way this was achieved was by building early prototypes or mockups allowed for validation of demand before expending resources to develop a solution. At later stages of the process, prototyping, testing and iteration was seen as the ideal way to minimize costs and manage risk. Some entrepreneurs also looked to supplement “affordable loss” with a safety net.

Similarly, in section 4.7.3, it is clear how entrepreneurs believe that learning from setbacks and creating change to avoid mistakes going forward is also an effective way of managing future risk. Overall, this implication is best summed up by the declaration of the one entrepreneur talked about how they follow a user centered, design thinking method as “when we design things, the design thinking method, in itself, gets rid of a lot of the risks”. This application of design thinking as a means of mitigating risk over and above what is absorbed with an “affordable loss” mindset, provides a potential enhancement to how effectuation is applied as a process.

The key implication here is how this builds on the conclusion by Mansoori and Lackéus (2017) that the practical weaknesses of effectuation can be addressed by drawing from design thinking. Thus by combining their conclusion and the findings, it is clear that effectual entrepreneurs can

benefit from learning about design thinking due to its ability to mitigate risk and compensate for some of the gaps in effectuation.

5.2.2 Entrepreneurs use effectuation as a decision-making tool to get “unstuck”

Almost every respondent talked about situations in their entrepreneurial journey that involved a setback or a situation where they did not have a clear way forward and a lot of ambiguity and uncertainty to navigate. Effectuation is well known as a theory to understand the way entrepreneurs navigate complexity, ambiguity and uncertainty (Sarasvathy, 2001). Often, the underlying mindset in effectuation is to welcome the surprise element (Sarasvathy, 2008) as a means of navigating complex situations with uncertainty and ambiguity. Entrepreneurs in the research setting assessed the current setback and looked to “leverage surprise” to adjust their goals and redirect their efforts armed with new knowledge on how to do things better. This was as expected in theory.

However, the research findings indicate that entrepreneurs often revisit effectual principles as a means of getting “unstuck” and making decisions in the face of ambiguity even in situations of more linear, causal thinking. This validates the suggestion by Nielsen and Christensen (2014) that effectuation is well suited for designers due to how it supplements the design process. For example, section 4.3.6 discusses how, in ambiguous situations, entrepreneurs revisited their “means” from the context of their current position in the entrepreneurial journey, and identified a new direction by assessing their capabilities, vision and values. This often meant that their vision was broad and aspirational, and served as a guide for decision-making that they could always fall back on and reorient themselves with to guide further action in new directions.

Entrepreneurs also looked at how leveraging interactions and commitments with customers could help navigate ambiguity and push forward, as shown in section 4.5.2. While effectuation navigates risk through affordable loss, it also applies to this context as breaking a “stuck” situation down into smaller elements, as shown in section 4.6.2, also helped navigate the ambiguity and uncertainty. These experiments were a way of learning more and finding a new direction and could be achieved alone or with partners.

With this evidence building on the theory from Nielsen and Christensen (2014), one key implication of this research is how designers should be able to use effectuation to navigate ambiguity and complexity even in traditional design processes. The findings are also in alignment with the study by Reymen et al. (2015) who conclude that effectuation “allows responding to flexibly changing circumstances” and that entrepreneurs use hybrid decision-making logics and often shift from one dominant logic to the other depending on the context of the entrepreneurial situation. The implication is also supported by Haynie, Shepherd, and Patzelt (2012) who equate the entrepreneurial mindset with cognitive adaptability as a way to identify opportunities, evolve goals and deal with change in the environment.

5.2.3 Other Implications

The key outcome of this study is how design thinking has demonstrable links to effectuation. Establishing these clear links between effectuation and design thinking leads to several more implications. These will be covered in brief in this section as diving into further detail exceeds the scope of this research.

From an education perspective, the existence of these links and the way the two theoretical constructs complement each other, will have extensive benefits for budding entrepreneurs and designers who are looking to learn process based approaches to take on complex challenges. This is in line with the hybrid decision-making model that is described by Reymen et al. (2015). To enable this in a more explicit manner, in section 5.3, a new hybrid process model is presented. It would also be useful to pilot the transfer of this knowledge in the Aalto courses related to Corporate Entrepreneurship and Design that currently covers these topics as disconnected entities.

Effectual reasoning can go hand in hand with design thinking based innovation processes to encourage entrepreneurial approaches to problem solving within corporate environments. This can also be applied to complex design problems that cannot be tackled with linear or causal processes, and as recommended in the “future research” section, this includes the tackling of “wicked problems” (Rittel & Webber, 1973). The findings also spark several possible research

questions that can still be explored further. Some of these are covered in more detail in the “future research” section

5.2.4 Considering Consequences

Priya Prakash (2019) criticizes how design thinking is detached from the practitioner’s values or passions when pursuing a “challenge” and this leads to an inability to account for unintended consequences as well as ethics at a broader context, despite design decisions effectively shaping the world. On the flipside, effectuation also has an issue with how it lacks ways to gain knowledge outside of partnerships (Mansoori & Lackéus, 2019), thus leading to similar potential for unintended consequences .

Another aspect that does not emerge in literature is how effectuation differs from design thinking in the way it does not necessarily bring in the potential users or consider the bigger context of any solution early in the definition of the problem and would rather approach this in the “ready-fire-aim” mode (Sarasvathy, 2008). The author acknowledges how this may end up creating harmful and problematic effects for the society that reflects the ignorance as well as the will and aspiration of those involved in the creation process. Effectuation and effectual reasoning should be accompanied by an alertness and awareness to the role of entrepreneurs in shaping our future as a species and not merely as GDP contributors. What is interesting is how in the VC marked up version of the Sarasvathy (2008) article, there is a comment referring to the section with the author’s warning with a dismissive pejorative expression which simply serves to reinforce the author’s warning about responsibility.

The entrepreneur is a powerful force of creation, but this power needs to be exercised responsibly in a manner that is not fueled purely by financial interest. It is entirely possible that as part of the fifth principle “the pilot in the plane”, the entrepreneur may choose to come up with a solution that considers the short term and long term influences on people, planet and the overall ethics of the solution, however, this is not an explicit aspect of effectuation. This is another reason why Moroz and Hindle (2012) might have been unable to classify effectuation as being the one common thread. Additionally, many examples of booming entrepreneurial

solutions in today's world – whether it is an AirBnB or Uber – have seen their innovation and disruption have negative impacts as well that warrant further discussion.

Design thinking does consider some of the impact with its strongly user centered approach and a deep focus on having diversity in the teams that create it, but this also means that the impact on the environment and ecosystem is not always considered. Thus, in an ideal future, what makes an entrepreneur entrepreneurial, should also be defined by their willingness to shape the future of the world in a manner that is conscientious and aware of potential negative impacts, almost as a 6th principle of effectuation.

5.3 Practical Implication - A new, hybrid effectual design process

In the reviewed literature, Sarasvathy (2001) and Reymen et al. (2015) already suggest that, effectuation does not exist in isolation and entrepreneurs often use a hybrid decision-making model that also considers causation. Sarasvathy (2008) also states how, in real life, entrepreneurs balance causal and effectual approaches depending on circumstances, the company's position in the life cycle and their level of expertise. In addition, given the logic provided by Reymen et al. (2015) that effectual reasoning is more present in broad, complex problem spaces - there was a clear possibility for greater resonance between design thinking and effectuation for tackling complex situations like an entrepreneurial journey. From the rest of the theoretical literature and the points discussed in the earlier sections of this discussion, we have established that there is sufficient evidence of key links between effectuation and design thinking.

In addition, the research from Mansoori and Lackéus (2017) establishes that effectuation and design thinking have advantages but also key gaps. For example, they highlight how effectuation has gaps from the perspective of lacking tactics that can be applied in a hands on manner, and lacking ways to gain knowledge outside of partnerships. They also acknowledge that effectuation has strengths from the perspective of uncertainty management, resource management and the ability to redirect and reorient in the face of surprises. This works well to supplement design thinking when taking on “wicked” problems as defined by Rittel and Webber (1973) which are design problems that are not clearly defined and require navigating uncertainty and ambiguity.

Potocnjak-Oxman, Kriz, and Nailer (2019) draw parallels between this and the ambiguity and uncertainty in developing an entrepreneurial opportunity.

On the basis of the links established in research, it might be possible to construct a hybrid process model, one that can be used in design projects to navigate ambiguity and uncertainty in an effectual way, while also using the human-centered, empathic nature of design to enhance the effectuation approach. This is supported in the literature in McMullen & Dimov (2013) who discuss how the entrepreneurial process transcends tradition discussions around creativity and strategy. In this case, the hybrid process is being proposed is an effectual design process as shown in Figure 12 below. The key goal is to leverage the strengths and benefits of either theoretical construct to fill the gaps and address criticisms of each of them individually.

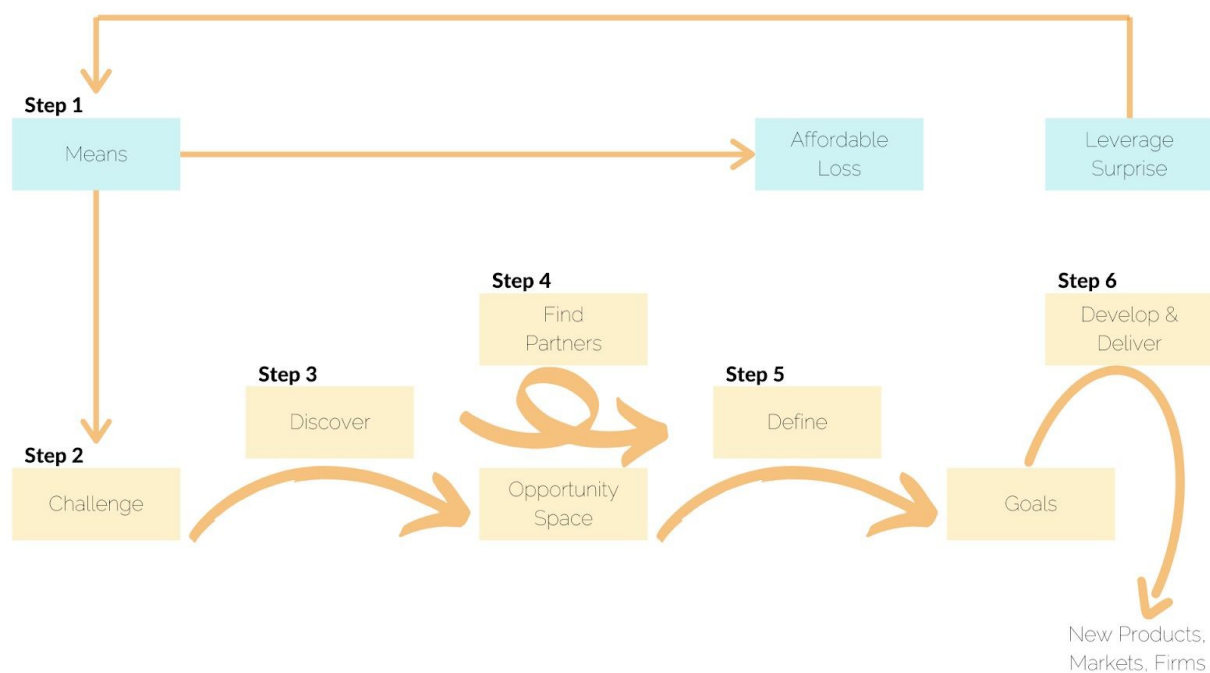


Figure 12 - A new, hybrid effectual design process

Right away, it is evident how this hybrid process addresses a criticism of effectuation by Moroz and Hindle (2012) that effectuation by itself is unsuccessful in conveying how effectual and causal logic co-exist in the entrepreneur and are used interchangeably in various contexts. In this

process, the top layer, highlighted in “blue” reflects elements of effectuation that are used as decision-making criteria at any point in time over the course of the entrepreneurial journey. These are elements that someone going through this process can always fall back on as a means of getting “unstuck” as described in section 5.2.2. The rest of this section will cover each of the steps and talk about the purpose and reasoning behind each one.

Step One - Identify your “Means”

In this step, the practitioner using this approach starts with the same questions that an effectual entrepreneur might ask themselves - a self assessment of “who am I? what do I know? who do I know?” While the latter two questions are straightforward, it is important to note that “the who am I” captures the values and passions of the practitioner. This serves two purposes

- As a decision-making tool to reorient one’s self during ambiguous situations in a process
- As an alignment tool to help identify common ground as well as gaps that can be addressed via acquiring partners (or teammates)

Incorporating a consideration for values and passions of the practitioner takes a step closer towards addressing the criticism by Priya Prakash (2019) about how the detachment from a practitioner’s values can lead to a lack of responsibility for unintended consequences as discussed in greater detail in 5.2.3. Using “means” and particularly the passions or motivations of the entrepreneur as an underlying decision-making criteria also addresses one of the criticisms by Moroz and Hindle (2012) that effectuation by itself minimizes the requirement for purposeful human action, particularly from the perspective of goal driven motivation.

Using “means” to define the “challenge” and as a way of identifying the possible opportunities that can be pursued addresses the criticism by Mansoori and Lackéus (2017) about how design thinking lacks clear methods to assess opportunities. Given the findings in section 5.1.1. about

the “means” influencing the opportunities that are pursued in “challenge”, this is more evidence that a hybrid process can address the downsides of both theoretical constructs in practice.

As part of identifying means, it is important to take stock of available resources as well, as this will provide the foundation for using “affordable loss” as a decision-making tool. By explicitly listing the resources and connecting to affordable loss, this leverages effectuation’s effectiveness for resource management to overcome the criticism of design thinking by Mansoori and Lackéus (2017) and Potocnjak-Oxman, Kriz, and Nailer (2019) about how it does not consider resources, even if it is important to navigate resource scarcity in a startup. Priya Prakash (2019) also echoes this same criticism, and for all these cases, the way effectuation includes “means” and “affordable loss” as central tenets in its innate strength of managing resources, allows for a hybrid approach to address both.

Step Two - Select a “Challenge”

Once the means have been identified, it is time to leverage these to select a “challenge”, ideally one that balances the practitioner’s “means” with the needs of the planet and the end user, or in the case of corporate innovation, balance the needs of the business.

This initial definition of a “challenge” can be broad and only loosely defined as it will be further clarified in the subsequent steps of this hybrid process.

Step Three - “Discover” the opportunity space

Whether a problem has already been provided, or an effectual approach is being followed where a foundation of the means lead to many possible opportunities, this divergent step is important to minimize risk and explore the potential opportunities that can be achieved for this “challenge” with the available “means”. The optimal way to achieve this would be via research, which could include talking to potential users, consulting with SMEs, analyzing market trends, or even reviewing competing products. The intent is to leverage the tools and methods available in the

“discover” phase of design thinking to get a broad understanding of the opportunity space and select “goals”.

Leveraging the extensive range of research methods available for this phase in design thinking, helps address the criticisms by Mansoori and Lackéus (2017) about how effectuation has gaps from the perspective of lacking tactics that can be applied in a hands on manner, and lacking ways to gain knowledge outside of partnerships. This linked approach also addresses one of the criticisms by Moroz and Hindle (2012) that effectuation by itself ignores the causal exchange between the entrepreneur and the context they exist in and how it can lead to imagining new outcomes.

Step Four - Find Partners for “Interactions” and “Commitments”

Using an assessment of one’s “means” combined with an idea of the “challenge” and the “goals” in an opportunity space, identify the kind of partners who would be most appropriate for this endeavor. These could also be self selecting partners who are aligned with the vision for the “challenge”. In the context of an in house project in a company, this could be specific stakeholders or people with specific skills who can help in this opportunity space.

These incoming partners provide their own set of “means” so it might be helpful to revisit and update the “means” available to better reflect the resources at the disposal of the collaborators and in turn, whether there are any changes to the “affordable loss” as well.

Step Five - “Define” the “Goals” for “New Products, Markets and Firms”

With the help of the partners selected in Step Three and using the tools and methods from the “Define” phase of design thinking, this convergent process identifies the core problem to solve. This can be done by validating the problem space, co-creating with partners or even creating an early visual mockup to assess preliminary demand for possible ideas.

Step Six - “Develop” ideas with “affordable loss”, then iterate and “Deliver” by “Leveraging Surprise”

Using the goals defined in Step Four as a starting point, there is a return to divergent thinking by exploring a range of ideas and leveraging “affordable loss” to create small experiments that can validate ideas or provide learning to create better ones. This goes hand in hand with convergent thinking where setbacks, failures and even the missteps of others in the opportunity space can lead to “leveraging surprise” and the building of a successful product at the end of the “deliver” phase.

Overall

This is a preliminary proposal for a hybrid process that combines the strengths of effectuation and design thinking to overcome any individual gaps or criticisms. A hybrid process also addresses the criticism by Kraaijenbrink (2012) that the extreme distinction between the effectual and causal logic is an oversimplification.

In addition, the intent is that this process can be applied to a range of contexts, whether it is a startup, or a student project or when tackling a complex project in any environment. A hybrid approach where the effectual elements of “means”, “affordable loss” and “leveraging surprise” are used as decision-making criteria in a process to take on a selected opportunity space, this provides one possible example for how the entrepreneurial process can take on “wicked problems” as defined by Rittel and Webber (1973). This hybrid process leverages the advantages of the effectual process and can be used to navigate complexity and uncertainty to develop opportunities (Buchanan, 1992) that can create significant change. This addresses another of the criticisms of effectuation by Moroz and Hindle (2012) about how effectuation by itself is not well suited to explore the entrepreneurial process as a mechanism for creating profound change like what is described by Schumpeter’s “creative destruction” (Diamond, 2006).

Over the course of defining this hybrid process, literature was frequently referenced in order to determine how well these two theoretical constructs could complement each other and compensate for criticisms that past research has posited. While, the hybrid process requires

further testing and refining in real world contexts, in its current, theoretical form, it addresses most of the key criticisms defined in the literature section. In particular, it accounts for all of the key criticisms that hamper effectuation by itself from being considered a defining entrepreneurial process model as established by Moroz and Hindle (2012), as well as addressing the individual weaknesses of both effectuation and design thinking as established in the comparative research by Mansoori and Lackéus (2019).

Going forward, it would be good to test this process, first with the initial respondents of this thesis research to see whether it resonates with them, and then test it in practice starting from “means” and taking it all the way to a solution. As a next step, it would also be good to see if there is a possibility to enrich this process with elements from other related theoretical constructs such as Lean Startup, Agile, Design Sprints, and more.

5.4 Research Limitations

This section will cover some of the limitations of the conducted research, both the literature as well as the empirical research. From a literature perspective, the research attempts to look at a wide range of sources ranging from major, peer reviewed publications to video recordings of conference keynote speeches. While the breadth of the sources considered is sufficient, there is a concern around bias in interpreting the data that stems from the researcher’s past experience with design as well as some experience with startups. This experience could lead to confirmation bias in the interpretation. However, the hybrid approach with a foundation in established theory and supported by empirical research should help mitigate this.

From the empirical research perspective, the research was conducted with a sample size of nineteen, with all but one meeting the criteria of being from early stage startups based in Finland. While this allows for generalizability of results within the Finnish context, one limitation of the research would be around whether the results can be generalized to other contexts as well. In addition, it can be questioned as to whether the results obtained from startups and entrepreneurial journeys translate to a generalizable finding around effectuation and design thinking that is

applicable in other contexts such as corporate entrepreneurship, intrapreneurship, or even the correlation between these approaches and the success and failure of the startup.

The current research is focused only on uncovering a possible link between effectuation and design thinking but as Moroz and Hindle (2012) and Mansoori and Lackeus (2017) indicate in their research, effectuation is one of several models for entrepreneurial processes and it cannot be considered the only possible explanation for the entrepreneurial process. In addition, in the empirical research, respondents mentioned other processes and theoretical constructs such as Lean Startup, Bricolage, Blue Ocean Strategy and Agile methods and it is a limitation of this research that it limits the scope to just two.

This dovetails with the limitation wherein, for the contrast in effectuation theory between effectual and causal approaches, the latter is being approximated as design thinking. Causal thinking, however, is an umbrella of methods, processes and mindsets of which theoretical constructs like design thinking and lean startup can be considered one variant but not the definitive one.

The empirical research relied on startup co-founders and C-level entrepreneurs and their recollection of their entrepreneurial journey. The accuracy of their memories can potentially be unreliable and in addition, there is also the potential for social desirability bias when asked for recollections of negative moments in their journey, such as setbacks and failures. This has been mitigated to an extent by using secondary research about the entrepreneur and their startup from publicly available information such as company blog posts, Crunchbase listings and news articles. This acted as a soft verification to help anchor the narrative in fact.

5.5 Avenues for Future Research

This section addresses the avenues for future research, that both expand on the findings from this research, and also potentially address the limitations covered in section 5.3.

Validation of Findings

To start with, it would be useful to take the findings and validate it with the research participants to confirm if there is a broad alignment with their views. This will allow for elimination of any bias that may have crept into the process via the researcher's perspective. In addition, it would also be beneficial to validate in other contexts to determine the extent to which the results can be generalized. These contexts include

- other countries with similar operating conditions for startups
- other countries with varied operating conditions for startups to see whether the external conditions influence the results
- other company types and contexts, whether it is growth stage or exit stage startups, or corporate intrapreneurship and more

The possibility of combining the complementary elements of effectuation and design thinking to craft a hybrid process that reflects the hybrid nature of thinking from literature, this has interesting potential. However, this requires further research to see if such a hybrid approach better addresses the criteria used by Moroz & Hindle (2012) to establish a unifying process model of entrepreneurship.

Expanding Research to other Contexts and Research Methods

If not validation, then fresh research in these contexts in the same structure as this current approach would also be beneficial as a way to contrast and determine whether the findings hold true across contexts, as well as validating the repeatability of the methodology.

In addition, it would also be interesting to see if the findings obtained via semi structured interviews and narrative enquiry hold up in the day to day activity of these startups. For this purpose, a set of comprehensive case studies with the researcher embedded in various contexts for longer durations would provide a different perspective. It will allow for more detailed observations that might only appear when immersed in the startup environment for an extended duration.

Including other theoretical constructs

The interview responses featured other methods such as Lean Startup which were mentioned repeatedly. It would be worthwhile to explore in future research how this and other concepts such as entrepreneurial bricolage (Fisher, 2012), blue ocean strategy and more are linked to the theoretical concepts being explored in this research. It would also be beneficial to consistently define some of the terms that are used repeatedly (and sometimes interchangeably) to describe various elements of the process such as innovation, creativity and disruption.

It would be beneficial to incorporate complementary findings from these theoretical constructs in the hybrid process model that has been proposed and then determine if it meets the criteria established by Moroz & Hindle (2012) to define a unifying process model of entrepreneurship.

6 Conclusion

In the literature review of this research, there were theoretical possibilities that there were some links between effectuation and design thinking. There were also several pieces of evidence that justified the need for empirical research, such as the work by Read et al. (2016) who stress the need for research to establish better theory around deliberate practice of effectuation and its links with predictive strategies.

The research process with 19 case studies with predominantly Finnish entrepreneurs leads to a set of findings that are generalizable to the context of the Finnish startup environment. Within this context, the findings from the empirical research prove definitively that effectuation and design thinking are linked. With the findings section showcasing a plethora of examples from entrepreneurs who are applying these theoretical constructs in practice, it is clear that the research has successfully answered the research question ***“what is the link between effectuation and design thinking in the entrepreneurial process?”***.

In the findings section, the five main links between effectuation and design thinking are detailed, with the first one providing a starting point and key decision-making criteria for entrepreneurs, their “means” and its link to the entrepreneurial opportunities explored in the “challenge” aspect of design thinking. The other sections establish links between multiple other elements of the two theoretical constructs, whether it be selecting partners, or exploring the opportunity space to set “goals” via the design thinking processes of “discover” and “define”, or the use of “affordable loss” and “leveraging contingencies” to pursue the iterative nature of design in “develop” and “deliver”.

In the discussion section, this is then juxtaposed with known theoretical constructs from the literature review. In some cases, the empirical findings support and provide additional evidence for elements indicated in literature, while in others, the empirical findings build on existing theory to provide avenues for new theoretical contribution. Building on these findings, a hybrid effectual design process is proposed in line with how the entrepreneurial process transcends traditional discussions around creativity and strategy (McMullen & Dimov, 2013).

The research outcomes are generalizable to the Finnish context only, and it is recommended that this either be validated in other contexts or similar research be conducted elsewhere in order to determine the broader applicability of the findings. In addition, future research should also account for other theoretical constructs such as “Lean Startup” and leverage that to further enhance the hybrid understanding. Once these perspectives are incorporated, it would be useful to verify if this hybrid process addresses the criteria set by Moroz and Hindle (2012) to establish a unifying process model of entrepreneurship.

Overall, the research builds on known theory and contributes multiple avenues of new knowledge. The contribution toward formulating a hybrid process construct has potential, both in the case of practical application and in the case of entrepreneur or design education and further research is warranted to validate this construct and build on it. Overall, the thesis successfully answers the research question and provides new findings that both validate existing theory and also provides new theoretical contributions as well.

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8 Appendices

APPENDIX A - Qualitative Research Interview Questionnaire

All content in grey indicates researcher's notes and reminders and were not part of the question being asked.

Demographics (5 minutes)

- Age of Startup (in years)
- Startup Phase - Startup, Transition, Scaling, Exit
- Number of Employees
- Prior Entrepreneurial Endeavors - First timer vs Experienced

I know it is been quite a process to get here, but that is what I'm here to find out more about. I'm going to ask you a few questions about specific moments in your startup journey.

Scenario Questions (25-40 minutes)

Note for researcher - For all these questions - do not just settle for the surface response, probe deeper like 5 Whys or Narrative Research to identify underlying causality/mindset

(Bird in hand)

Think back to when you first came up with the idea for this startup. What inspired it? What did you consider when getting into it? Walk me through that stage.

(Pilot in the plane)

When you're running the startup and have to take decisions, on say something like a future direction, what are the factors that guide these decisions?

(Patchwork Quilt)

Do you have any partner organizations in your current endeavors whether as a supplier or a co-creator or a customer? Think back to the time when you uncovered and agreed on that partnership. How did it happen? What influenced that decision for you?

(Lemonade)

I hope it is fair to assume that your journey so far has not been seamless but has involved navigating bumps along the way. Now I want you to think back to the last time you had a setback in your startup journey that you had to bounce back from. What happened? How did you respond to it? Can you describe that time for me?

(Affordable loss)

Now that we have talked about setbacks, let us look to the future. Have you done any planning for future setbacks or thought about contingencies? What was the thinking behind this?

(Process - Design thinking or others)

Now say you have an idea for a new aspect of your startup offering. Something like a new feature or service. What is the process for your startup to get this from an idea to something real and tangible?

Effectuation or Design Thinking or Others (5-10 mins)

(it need not just be effectuation or design thinking, it could be Lean Startup or Bricolage or any other process or mindset)

- Are you aware of something called effectuation?
 - *(if yes)*
 - Tell me more.
 - How does it apply to your journey so far and how you work now?
 - How do you feel about the process?
 - *(if no, move on)*
- How about design thinking?
 - *(if yes)*
 - Tell me more.
 - How does it apply to your journey so far and how you work now?
 - How do you feel about the process?
 - *(if no, move on)*
- Is there any other process or method or way of doing things that you apply towards how you have brought your startup along so far? *(If there is something that came up earlier in the interview, ask about that)*
 - *(if yes)*
 - Tell me more.
 - How has it influenced your journey so far and how you work now?
 - How do you feel about the process?
 - *(if no, move on)*

Wrapping Up (5-10 mins)

(If there is something that came up earlier in the interview, ask about that)

- Once you have received a round of funding, have you experienced any demands from those who are providing the funding? How do these outside demands influence the freedom of how you work?

- So far, we have talked a lot about your way of doing things. As you continue along this path, what does success look like for you? What do you think you need to do (or keep doing) in order to achieve that success?
- Assume that it is been a few years from now - you have achieved that success and your company has now started to scale. Do you think your way of working might change to cope with the scaling or would you continue the same way you do now?
- Is it ok if I get in touch with you after the analysis is done (likely in July/August) to share and discuss the general insights that I found to see if they resonate with you?

Conclusion

Thank you so much for your time. Just to remind you, there will be no personal details or trade secret details revealed in my research findings. I'm only seeking to understand the thought process and how you work and your responses have been invaluable for my thesis. Thanks again.